Giuseppe Notarbartolo di Sciara & Alexei Birkun, Jr.

Conserving whales, dolphins and porpoises in the Mediterranean and Black Seas

An ACCOBAMS status report, 2010

With the financial support of
Département des Relations Extérieures - Principauté de Monaco

Cover photo: Short-beaked common dolphins *(Delphinus delphis)* near Kalamos, western Greece, where they were plentiful as recently as the mid-1990s but are now rarely seen. The Mediterranean population of common dolphins is listed as Endangered in the IUCN Red List. A conservation plan commissioned by ACCOBAMS has been available since 2004, but no significant implementation of measures outlined in the plan has occurred. Photograph by Giovanni Bearzi/Tethys Research Institute.

Suggested citation: Notarbartolo di Sciara G., Birkun A., Jr. 2010. Conserving whales, dolphins and porpoises in the Mediterranean and Black Seas: an ACCOBAMS status report, 2010. ACCOBAMS, Monaco. 212 p.

Table of Contents

Palais de Monaco

October 2010

Being migratory species, cetaceans travel across national boundaries, and thus can be safeguarded only if the States act jointly and harmonize their efforts to halt the threats that hang over these species and their habitats.

By adopting the ACCOBAMS Agreement in 1996, 15 Mediterranean and Black Sea Countries confirmed their commitment to the conservation of the cetacean species. In 2010, the number of Parties to ACCOBAMS has reached 23, representing more than 80% of the Countries in the area covered by the Agreement. The adoption of ACCOBAMS is also a demonstration of the intent of these Countries to strengthen their cooperation and mutual assistance to achieve a better conservation status for cetaceans in the Black Sea, the Mediterranean and the Atlantic contiguous waters.

During the past years many initiatives were undertaken to implement the provisions of ACCOBAMS. But despite these efforts by Governments, International Organisations and NGOs, cetacean populations remain under threat from various sources of pressure, and the level of threats is still too high to ensure a good conservation status for these species.

The authors of this document, Dr Giuseppe Notarbartolo di Sciara and Dr Alexei Birkun Jr, are two distinguished cetacean specialists who devoted a great part of their scientific career to the marine environment and in particular to the conservation of marine species and their habitats. Through the compilation of the available knowledge about the status of the cetacean species in the ACCOBAMS area, the authors provided in this document an assessment of what has been done to implement ACCOBAMS, including achievements and failures, and presented an updated review of the threats to cetaceans in the region. While concluding that important knowledge gaps still exist concerning the scientific understanding of cetacean ecology, biology and pressures, the authors stress that conservation measures should not be delayed, and filling such gaps should go in parallel to the implementation of conservation action.

I firmly hope that Governmental authorities, scientists, NGOs, sea users and others stakeholders will use the valuable information and data contained in this document to implement in the coming years further measures for the conservation of cetaceans.

2. Summary

1. Why protect Mediterranean and Black Sea cetaceans. The whales, dolphins and porpoises found in the Mediterranean and Black Seas and in a small portion of the Atlantic Ocean contiguous to the Strait of Gibraltar live in precarious conditions because the intense human presence and activities in this marine region are the source of a variety of pressures which threaten these mammals' survival. Protecting cetaceans is important not only because of their intrinsic natural value, but also because conservation actions favouring whales and dolphins may extend their benefits to other species and to the environment they are part of. Considering that these animals are highly mobile, and therefore rarely confined to waters within the jurisdiction of any single nation, cetaceans offer an exemplary case in which conservation needs cooperation amongst all range states. Accordingly, the CMS Agreement on the conservation of cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) was created about a decade ago to implement activities and measures to address threats to cetaceans in the region in a cooperative fashion, in order to ensure their survival.

2. Presence and status of cetaceans in the ACCOBAMS area. Although the ACCOBAMS marine area is only a small portion (about 1%) of the world's oceans, the cetacean diversity it contains is remarkable. At least 11 species regularly occur in the region (fin whale, sperm whale, Cuvier's beaked whale, killer whale, long-finned pilot whale, Risso's dolphin, rough-toothed dolphin, common bottlenose dolphin, striped dolphin, short-beaked common dolphin, and harbour porpoise). Three of these species consist of two subspecies each: common bottlenose dolphin in the Mediterranean and Black Sea common bottlenose dolphin; short-beaked common dolphin in the Mediterranean and Black Sea short-beaked common dolphin; and North Atlantic harbour porpoise in the Contiguous Atlantic Area and Black Sea harbour porpoise in the Black Sea, Marmara Sea and Northern Aegean Sea. In addition to these species regularly occurring in the area, three other species are considered visitors (common minke whale, humpback whale, false killer whale); eight are vagrant (sei whale, common minke whale in the Black Sea, North Atlantic right whale, grey whale, dwarf sperm whale, northern bottlenose whale, Blainville's beaked whale, Gervais' beaked whale); and two (Indo-Pacific humpback dolphin, beluga) are alien. Of the cetacean populations regularly occurring in the ACCOBAMS area, one (killer whale) was proposed for inscription in the IUCN Red List as *Critically Endangered;* four (sperm whale, Mediterranean short-beaked common dolphin, Black Sea and Aegean Sea harbour porpoise, Black Sea common bottlenose dolphin) as *Endangered;* four (fin whale, Mediterranean common bottlenose dolphin, striped dolphin, Black Sea short-beaked common dolphin) as *Vulnerable;* one (North Atlantic harbour porpoise) as *Least Concern;* three (Cuvier's beaked whale, long-finned pilot whale, Risso's dolphin) as Data Deficient, and one (rough-toothed dolphin) was not assessed yet. For each of the species occurring in the ACCOBAMS area this document provides the scientific name and the common names in the main languages of the region, taxonomic status, world distribution, known occurrence in the territorial waters of the range States, and succinct details of the distribution in the Mediterranean and Black Seas, habitat and ecology, population data, and status.

3. How are threats to cetaceans in the ACCOBAMS area evolving. An updated review of threats to cetaceans in the ACCOBAMS area is presented, comparing the current situation with what was described soon after the Agreement came into force (Notarbartolo di Sciara 2002a). The actual known or presumed status of the different threats is briefly reviewed, and includes: interactions with fisheries; disturbance, injuries and mortality from shipping; habitat loss and degradation, including chemical pollution; anthropogenic noise; direct killing and live captures; and climate and ecosystem change. Concerning fin whales, ship strikes remained a primary threat; climate effects, including potential effects on prey availability, is of greater concern today, and so has become anthropogenic sound; disturbance and various forms of pollution remain secondary. Entanglement in driftnets and ship strikes have remained the main threats to sperm whales; anthropogenic sound (particularly in connection with gas & oil exploration) is a potential threat, and the illegal use of dynamite for fishing may be locally important (e.g., in Crete); chemical pollution remain secondary, although solid waste (plastic ingestion) is potentially relevant; disturbance (whale watching included) remains a secondary concern. Noise (from military sonar and possibly from seismic surveys) is confirmed as a primary threat to Cuvier's beaked whales; entanglement in driftnets is another primary factor, as well as possibly the illegal use of dynamite for fishing (e.g., in Crete); pollution remains secondary, although solid waste (plastic ingestion) is potentially relevant. No change was evident concerning long-finned pilot whales, with entanglement in driftnets remaining the main threat.

Concerning little-known Risso's dolphins, the threat of entanglement in driftnets was added to that from disturbance; pollution remains sec-

ondary, although solid waste (plastic ingestion) is potentially relevant. Threats to striped dolphins were largely unchanged (with pollution and entanglement in driftnets remaining high, global change uncertain and disturbance secondary); however, the continuation of a threat from pathogens was noted, as morbillivirus epizootics revealed to be recurrent in the region. Coastal odontocetes appeared to be subjected to higher levels of threat than previously acknowledged, due in large part to coastal habitat loss and degradation affecting common bottlenose dolphins, short-beaked common dolphins, and harbour porpoises. Prey depletion remains a major threat to common dolphins (posed by industrial overfishing), and potentially secondary to bottlenose dolphins and harbour porpoises (by artisanal and industrial fishing). Bycatch is a threat to all three species, but the greatest concern involves the Moroccan driftnet fishery in the Alborán Sea affecting common dolphins and the near-bottom gillnet fishery in the Black and Azov Seas affecting harbour porpoises. Bottlenose dolphins are widely persecuted throughout the Mediterranean and in some areas of the Black Sea as a result of operational interactions with artisanal fisheries, and are being live-captured for display in dolphinaria. Pollution remains a primary threat to all three species, due to the higher contamination of their coastal habitats. Finally, two species that were not considered in 2002 include killer whales and rough-toothed dolphins. Killer whales are thought to be mostly affected by persecution from fishermen and depletion of their main prey (bluefin tuna). Rough-toothed dolphins are known to become entangled in fishing gear in the Levantine Sea, and may also be impacted upon by anthropogenic noise.

4. Measures to protect cetaceans in the ACCOBAMS area. Current measures and actions to conserve cetaceans in the region include the presence and improvement of an appropriate legal framework in Member States, as well as the implementation of conventional conservation measures (e.g., regulations concerning fisheries, maritime transportation, and a number of activities susceptible of introducing pollution). Particular attention deserves the use of marine protected areas (MPAs) as a tool to conserve cetaceans in the region. At their 3rd Meeting in 2007 the ACCOBAMS Parties supported in principle the creation of 17 MPAs as recommended by the Scientific Committee, and welcomed criteria and guidelines for setting up additional MPAs in the region which include management plans to address threats to cetaceans. To date, there has been some progress in a number of the areas, including small portions of the Alborán Sea with proposed and declared Special Areas of Conservation (SACs) within the *Natura 2000* framework, as well as maritime traffic regulations that have been enforced near Cabo de Gata and in the Strait of Gibraltar to protect cetaceans.

However, only one area has been formally declared, the “Regno di Nettuno Marine Protected Area” around the island of Ischia, off Naples, Italy. A special attention deserves a current effort within the framework of UNEP’s Mediterranean Action Plan to designate a network of protected areas in international waters, and the need for reviving the effectiveness of the only currently existing MPA in areas beyond national jurisdiction, the “Pelagos Sanctuary for Mediterranean Marine Mammals”.

5. What is most needed to improve the conservation status of cetaceans in the ACCOBAMS area. A comprehensive assessment of the Agreement’s accomplishments and shortcomings, to allocate conservation efforts so that the limited human and financial resources available are used with maximum effectiveness, should include analyses of: the scientific knowledge that is still needed for the implementation of conservation measures; how to improve management effectiveness (e.g., where capacity building is most needed) in matters relating to cetacean conservation; and how the effort of conserving cetaceans can be boosted by enhancing public awareness of the need for a greater stewardship for the marine environment.

6. Advancing scientific knowledge. Although conservation and management action can and should now proceed in practice without further ado, with the support of the conspicuous scientific understanding of cetacean ecology, biology and pressures that was gained in the ACCOBAMS area during the past two decades, important knowledge gaps still exist, and striving to fill such gaps in parallel to the implementation of conservation action will significantly improve management effectiveness. The main gaps that should be addressed as soon as possible concern the population ecology of cetaceans that are regular in the Agreement area (i.e., investigating their abundance and distribution, as well as the space and time variability thereof, to identify the presence of critical habitat with an effort to be uniformly distributed across the region); an understanding of the structure of such populations (i.e., to identify population geographic boundaries and assess levels of their reproductive isolation, to facilitate the identification of units to conserve); and a geographic representation of the distribution of the various man-induced pressure factors that impact on these populations.

7. Need for action. Implementing effective conservation of marine mammals in any of the world's marine regions is a challenge, and this is particularly true in the ACCOBAMS area due to the extent and intensity of human-derived pressure factors. One thing is for nations to resolve in good faith to undertake actions that may eventually bring to a better conservation status of cetaceans of the Mediterranean and Black Seas – as attested by the many resolutions adopted at the Meeting of Parties of ACCOBAMS – and another is putting such actions in practice, bearing the political costs involved in addressing conflicts between marine conservation and human activities at sea, striving to keep such activities sustainable, developing the actual capacity of doing so, and ultimately ensuring in reality that cetaceans in the region are not worse off (and possibly better off) today than they were yesterday. Challenges involve, amongst other things, addressing in practice the various threats deriving from interactions with fisheries, disturbance, ship strikes, chemical pollution, noise, and climate change. Two aspects of cetacean conservation that are particularly delicate include MPAs designation and management, and setting up effective intervention plans and mechanisms in the case of challenging stranding events.

8. Increasing public awareness. Despite human fascination with cetaceans and protective legislation in the ACCOBAMS area, undeniably conservation efforts for these marine mammals have achieved limited results to date, and by consequence cetacean populations still face an uncertain future in the region. Considering that all conservation problems derive to cetaceans from human activities, management efforts will achieve very little without popular support. To obtain a real improvement, human societies must understand and accept to modify their values and re-calibrate activities that contribute to the decline of marine mammals and of the marine ecosystems they live in. There can be no doubt that awareness and education of the wide public are key to effective conservation, and it is in this domain, rather than in the scientific and legal domains, that progress is most needed. Awareness programmes and campaigns targeting amongst others the general public, the schools, the teachers, the media, and the judiciary and enforcement communities, should be professionally conducted year after year, in all countries, and adequately funded.

9. Time for a strategic update stimulated by new political vigour? Conserving cetaceans in the ACCOBAMS area is just one of the many facets of the challenging imperative of overcoming the confrontation between an idealistic view of environmental conservation and the socio-economic day-to-day realities of human society. Concern cannot be avoided that the level of implementation of the ACCOBAMS provisions is still too limited to effectively address the existing and rapidly developing environmental problems in the Agreement area. In many cases, however, simply deciding to do what nations have already agreed on doing would make a substantial difference. Management measures that will benefit cetaceans, involving sustainable fishing, curbing marine pollution and protecting biodiversity, are already embedded in a large number of existing legislation and treaties. If all such measures, invoked by international, regional and national legal instruments for the prudent management of human activities in the Mediterranean and Black Seas were to be fully implemented and enforced, and if the concerned States were doing everything they had committed to, based on multiple obligations under agreements that they have ratified and that are already in force, many of the problems preventing whales, dolphins and porpoises from reaching a favourable conservation status would be adequately addressed, and the recovery of their populations would become possible. In other cases, the adoption of innovative, less invasive technologies related to the human exploitation of the marine environment, which have become available in recent years, would concur to improve currently critical conditions; however, governments would greatly help the process if they were to provide appropriate and targeted incentives for the concerned industries to adopt them. The negotiations of ACCOBAMS were concluded in 1996, and the Agreement came into force shortly thereafter. Fourteen years is a long time at the current pace of global change, and many of the conditions under which ACCOBAMS was formulated – involving societies and their values, governance, economics, technology, the environmental conditions, our scientific understanding of cetacean ecology and conservation, and, most relevantly, the status of the concerned populations – have all experienced substantive transformations during this period. It seems reasonable to consider that the time has now come for ACCOBAMS to reassess its accomplishments and failures, to identify its strong and weak points, and draw up a new strategy and action plan to best match the ongoing changes, learn from the past experience, and strive to succeed in securing the continued presence of cetaceans in the region for the future generations.

3. List of acronyms and abbreviations

- **ABNJ** Area beyond national jurisdiction
- **ACCOBAMS** Agreement on the conservation of cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area
- **AMD** Acoustic mitigation device
- **ASCOBANS** Agreement on the conservation of small cetaceans of the Baltic, North East Atlantic, Irish and North Seas
- **CBD** Convention on biological diversity
- **CI** Confidence interval
- **CITES** Convention on international trade in endangered species of wild fauna and flora
- **CMS** Convention on migratory species
- **CPBSC** Conservation plan for Black Sea cetaceans
- **CV** Coefficient of variation
- **EBFM** Ecosystem-based fisheries management
- **EBM** Ecosystem-based management
- **EBSA** Ecologically or biologically significant area
- **EEZ** Exclusive economic zone
- **EIA** Environment impact assessment
- **EU** European Union
- **FAO** Food and agriculture organisation of the United Nations
- **GFCM** General Fisheries Commission for the Mediterranean
- **ICCAT** International Commission for the conservation of Atlantic tuna
- **ICMMPA** International conference on marine mammal protected areas
- **IMO** International Maritime Organisation
- **INSTM** Institut national des sciences et technologies de la mer (Tunisia)
- **IUCN** International Union for the conservation of nature
- **IUU FISHING** Illegal, unreported or unregulated fishing
- **MAP** Mediterranean action plan
- **MEDACES** Mediterranean database of cetacean strandings
- **MoP** Meeting of parties
- **MPA** Marine protected area
- **MSP** Marine (or maritime) spatial planning
- **NATO** North Atlantic treaty organisation
- **NGO** Non-governmental organisation
- **OBIS SEAMAP** Ocean biogeographic information system– spatial ecological analysis of mega vertebrate populations
- **POP** Persistent organic pollutant
- **RAC/SPA** Regional activity centre/specially protected areas
- **REMPEC** Regional marine pollution emergency response centre for the Mediterranean Sea
- **SAC** Special area of conservation (Natura 2000 network)
- **SINP** State Institute for nature protection (Croatia)
- **SPA/BD PROTOCOL** Protocol to the Barcelona Convention concerning specially protected areas and biological diversity in the Mediterranean
- **SPAMI** Specially protected area of Mediterranean importance
- **TSS** Turkish straits system
- **UNEP** United Nations environment programme

4. Introduction: ACCOBAMS and the imperative to conserve cetaceans

The need to conserve marine biodiversity is today a globally accepted principle, enshrined in several international agreements and conventions, most notably the Convention on Biological Diversity (CBD), which is in force since 1993 and has today 193 Parties. There are clear links between the level of biodiversity in an ecosystem and its functioning (Micheli & Halpern 2005), and protecting biodiversity therefore has positive effects on the environment (Worm et al. 2006).

Marine mammals, and cetaceans in particular, in their quality of apex predators represent an important element of marine biodiversity, which is, however, seriously threatened in most of the world's marine ecosystems. In particular, cetaceans living in the Mediterranean and Black Seas must face the manifold pressures which are exerted on the marine environment by a variety of human activities in these semi-enclosed seas.

Cetaceans are very mobile species, and many are highly migratory. With few exceptions, these mammals are not confined to waters within the jurisdiction of any single nation, and this is particularly true in the ACCOBAMS area, where most countries have not declared their Exclusive Economic Zones (EEZs). By contrast, critical habitats of most cetacean populations living in the Mediterranean and Black Seas extend across waters under the jurisdiction of different nations, as well as in areas beyond national jurisdiction (ABNJ). As a consequence, cetaceans offer an exemplary case in which conservation needs cooperation amongst the different countries.

Based on such rationale, and stimulated by concern for the conservation status of cetaceans in their region, the nations bordering on the Mediterranean and Black Seas resolved to implement an agreement to ensure the survival of whales and dolphins in the area, called "Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area" (ACCOBAMS). ACCOBAMS is an agreement concluded pursuant to a specific provision of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, or CMS). The Parties to CMS, which is a treaty having a worldwide sphere of application, acknowledge the importance of conserving migratory species and "the need to take action to avoid any migratory species becoming endangered" (Art. II, paras. 1-2). More specifically, Art. IV, para. 4, encourages the Parties "to take action with a view to concluding agreements for any population or any geographically separate part of the population of any species or lower taxon of wild animals, numbers of which periodically cross one or more national jurisdictional boundaries" (Scovazzi 2002).

One may wonder whether it is logical or even admissible to justify significant commitment of human and economic resources to conserve a single animal taxon – the cetacea – which counts in the region less than a dozen regularly occurring species (see Tables 1 and 2), when, based on recent estimates, the Mediterranean is populated by approximately 8,500 macroscopic species of animals and plants (Bianchi & Morri 2000), whereas a total of over 3,770 species of multicellular organisms are listed for the Black Sea flora and fauna (Zaitsev & Mamaev 1997).

However, there are two reasons why dedicating a special effort to the conservation of marine mammals, and cetaceans in particular, is justifiable. First, marine mammals are an important component of marine biodiversity due to their apex position in the trophic webs (Katona & Whitehead 1988, Bowen 1995), and the loss of apex predators may damage and weaken the ecosystems in which they live (Bascompte et al. 2005). Based on such considerations, conserving cetaceans has an intrinsic value, and this is one of the reasons why nations have broadly adopted this concept. Second, conservation actions favouring whales and dolphins may extend their benefits to other species and to the environment they are part of. Cetaceans can be considered at the same time umbrella species, because actions to conserve them may have positive cascading effects on other species (Roberge & Angelstam 2004), and flagship species, due to the attraction they exert on the wide public, thereby lending themselves to awareness actions in favour of marine conservation in general (Garibaldi & Turner 2004). Finally, in their quality of apex marine predators, cetaceans can be useful indicators of the state of health of the marine environment (Wells et al. 2004), and it is easier to monitor mammals than other marine predators due to their dependence from the surface for their breathing needs, and hence visibility.

Notwithstanding clear indications that most cetacean populations living in ACCOBAMS waters are reduced in comparison to the recent past, even only a century ago (e.g., Bearzi et al. 2004, Lotze & Worm 2009), the region still hosts a considerable diversity of species (Tables 1 and 2), and areas exist where cetaceans are found in remarkable densities. This demonstrates that the

Mediterranean and Black Seas continue to have an important status for cetacean survival at the global scale, and justifies the current efforts for conserving their population in the region. The imperative of conserving cetaceans coincides with the imperative of protecting the marine environment, which is part of the natural heritage and an economic and aesthetic asset of the region's riparian nations.

Unfortunately, in spite of the wealth of national and international legal instruments that were adopted to protect cetaceans, and of the fascination that these animals elicit in the wide public, the future of cetaceans in the ACCOBAMS area continues to be uncertain. Conservation efforts have not yielded concrete results in terms of population stabilisation or recovery (Notarbartolo di Sciara 2007b, 2008). Of the 13 taxa which are present in the Mediterranean and Black Seas with regular populations (Tables 1 and 2), all those which could be assessed (i.e. which were not judged to be Data Deficient) can be ascribed to a threat category, and none of them has shown any signal of improvement yet. Very likely the species which are currently Data Deficient, once assessed, will reveal not to be in a much better situation than the rest.

5. Cetaceans of the Mediterranean and Black Sea: overview of species and their status

Several accounts exist of the cetacean species found in the Mediterranean and Black Seas. In this document we refer in large part to a review which was presented at the first Meeting of parties of ACCOBAMS (Notarbartolo di Sciara 2002b), supplemented by a more recent review (Reeves and Notarbartolo di Sciara 2006) which reported on the results of a workshop organised by ACCOBAMS and IUCN in March 2006 to assess the status of cetacean populations in the ACCOBAMS area. IUCN Red List assessments of such populations were subsequently reviewed and submitted to the Red List Authority in Cambridge, and their formal adoption is currently ongoing.

The species of Cetacea[1] found in the ACCOBAMS area are listed in the following tables 1-5. Table 1 lists the 11 species that are represented by populations which are regularly[2] present in the Mediterranean Sea and Contiguous Atlantic. Table 2 lists three cetacean species regular in the Black Sea. Visitor[3], vagrant[4] and alien[5] species are listed, respectively, in Tables 3, 4 and 5.

Only species listed in Tables 1 and 2 deserve status assessment, given that the others are represented by populations living outside of the region. So far, populations that were formally assessed in the Red List include the Mediterranean short-beaked common dolphin and all three Black Sea cetaceans. For all the others, proposals have been finalised although their formal inclusion in the Red List is still pending.

1 Having been ascertained that cetaceans genetically and morphologically fall within the arctiodactyl clade, some authors (e.g., Committee on Taxonomy 2009) included them in the Order Cetartiodactyla, with Cetacea, Mysticeti and Odontoceti as unranked taxa. However, we recognise that the classification of whales and dolphins within the Cetardiodactyla is still unresolved, and therefore we prefer to maintain Cetacea in this document.

2 Regular: a species represented by a population having within the region its native distributional range.

3 Visitor: a species represented by individuals found outside their native distributional range, which repeatedly, albeit irregularly, appear in a given region.

4 Vagrant: a species represented by individuals found outside their native distributional range, appearing in a given region with extreme rarity.

5 Alien: a species living outside its native distributional range, which has arrived in the region as a consequence of human activities, either deliberate or accidental.

common name	scientific name	mostly found in	conservation status	notes
Fin whale	*Balaenoptera physalus*	throughout the Mediterranean and Contiguous Atlantic Area	Vulnerable	
Sperm whale	*Physeter macrocephalus*	throughout the Mediterranean and Contiguous Atlantic Area	Endangered	
Cuvier's beaked whale	*Ziphius cavirostris*	throughout the Mediterranean and Contiguous Atlantic Area	Data Deficient	
Killer whale	*Orcinus orca*	Strait of Gibraltar and Contiguous Atlantic Area	Critically Endangered	
Long-finned pilot whale	*Globicephala melas*	throughout the western Mediterranean and Contiguous Atlantic Area	Data Deficient	
Risso's dolphin	*Grampus griseus*	throughout the Mediterranean and Contiguous Atlantic Area	Data Deficient	
Rough-toothed dolphin	*Steno bredanensis*	Levantine Sea and possibly in the Contiguous Atlantic Area	Not assessed	Formerly considered visitor to the Mediterranean
Common bottlenose dolphin	*Tursiops truncatus*	throughout the Mediterranean and Contiguous Atlantic Area	Vulnerable	
Striped dolphin	*Stenella coeruleoalba*	throughout the Mediterranean and Contiguous Atlantic Area	Vulnerable	
Short beaked common dolphin	*Delphinus delphis*	throughout the Mediterranean and Contiguous Atlantic Area	Endangered	Status formally recognised by the IUCN Red List
Harbour porpoise	*Phocoena phocoena relicta*	Northern Aegean Sea	Endangered	Northern Aegean animals likely of Black Sea origin, in which case their status is formally recognised by the IUCN Red List
	Phocoena phocoena phocoena	Contiguous Atlantic Area	Least Concern	

Table 1 – Cetacean species represented by populations regularly present in the Mediterranean Sea and Contiguous Atlantic Area.

common name	scientific name	mostly found in	conservation status	notes
Common bottlenose dolphin	*Tursiops truncatus ponticus*	throughout the Black Sea	Endangered	Black Sea subspecies. Status formally recognised by the IUCN Red List
Short-beaked common dolphin	*Delphinus delphis ponticus*	throughout the Black Sea	Vulnerable	Black Sea subspecies. Status formally recognised by the IUCN Red List
Harbour porpoise	*Phocoena phocoena relicta*	throughout the Black Sea, Azov Sea, Marmara Sea	Endangered	Black Sea subspecies. Status formally recognised by the IUCN Red List

Table 2 – Cetacean species represented by populations regularly present in the Black Sea.

common name	scientific name	where occurred	notes
Common minke whale	*Balaenoptera acutorostrata*	Spain, Morocco, France, Italy, Tunisia, Greece, Israel	at least 30 certain occurrences in the last two centuries
Humpback whale	*Megaptera novaeangliae*	Spain, France, Italy, Tunisia, Slovenia, Greece, Syria	at least 15 certain occurrences in the last 120 years
False killer whale	*Pseudorca crassidens*	Spain, France, Italy, Malta, Croatia, Greece, Turkey, Egypt, Syria, Israel	at least 30 certain occurrences in the last 150 years

Table 3 – Cetacean species considered visitors to the Mediterranean Sea.

common name	scientific name	where occurred	notes
Sei whale	*Balaenoptera borealis*	Spain, France	Two strandings and three likely sightings in the Mediterranean since 1921
Common minke whale	*Balaenoptera acutorostrata*	Georgia	One stranding in the Black Sea near Batumi in April 1880
North Atlantic right whale	*Eubalaena glacialis*	Algeria, Italy	Two certain occurrences in the Mediterranean since 1877
Grey whale	*Eschrichtius robustus*	Israel, Spain	One individual repeatedly sighted in the Mediterranean in 2010
Dwarf sperm whale	*Kogia sima*	Italy	Two certain occurrences in the Mediterranean since 1988
Northern bottlenose whale	*Hyperoodon ampullatus*	Spain, France	Two certain occurrences in the Mediterranean since 1880
Blainville's beaked whale[6]	*Mesoplodon densirostris*	Spain	One certain occurrence in the Mediterranean (1980)
Gervais' beaked whale	*Mesoplodon europaeus*	Italy	One certain occurrence in the Mediterranean (2001). Species identification of a specimen live-stranded in Turkey (2008), likely *M. europaeus*, could not be confirmed.

Table 4 – Cetacean species considered vagrant in the ACCOBAMS area.

common name	scientific name	where occurred	notes
Indo-Pacific humpback dolphin	*Sousa chinensis*	Mediterranean coast of Israel	A species not uncommon in the Gulf of Suez (Red Sea). One individual repeatedly sighted in the Mediterranean, where it could travel thanks to the artificial Suez Canal.
Beluga	*Delphinapterus leucas*	Bulgaria, Romania, Turkey, Ukraine	One individual captured in the Sea of Okhotsk (Pacific Ocean) in 1987, escaped (or released) from an enclosure in Crimea in 1991 and was later (1992-95) sighted off several locations across the northwestern and southern Black Sea. A second individual was released (or escaped) at the same time and place and was also observed and reported in the wild several times, within the first few weeks after the release (escape) event, in the vicinity of Sevastopol.

Table 5 – Cetacean species considered alien to the ACCOBAMS area.

Cetacean species represented in the ACCOBAMS area by regular populations (Tables 1 & 2) are also listed in a variety of international and regional conservation legal texts. A summary of these is presented in Table 6.

6 Some *Mesoplodon* specimens, found in the past in the Mediterranean (in France and Italy), had been identified as *M. bidens* (e.g., Brunelli & Fasella 1928, Frantzis et al. 2003), however insufficient evidence was provided to support species identification; as a consequence, the presence of the species in the region remains unconfirmed.

common name	scientific name	Listed in
Fin whale	*Balaenoptera physalus*	Bern Convention, App. II Bonn Convention, App. I, App. II CITES, App. I SPA/BD Protocol, Barcelona Convention, Annex II
Sperm whale	*Physeter macrocephalus*	Bern Convention, App. II (Mediterranean) Bonn Convention, App. I, App. II CITES, App. I SPA/BD Protocol, Barcelona Convention, Annex II
Cuvier's beaked whale	*Ziphius cavirostris*	Bern Convention, App. I CITES, App. II SPA/BD Protocol, Barcelona Convention, Annex II
Killer whale	*Orcinus orca*	Bern Convention, App. I Bonn Convention, App. II CITES, App. II SPA/BD Protocol, Barcelona Convention, Annex II
Long-finned pilot whale	*Globicephala melas*	Bern Convention, App. I Bonn Convention, App. II (North and Baltic Seas) CITES, App. II SPA/BD Protocol, Barcelona Convention, Annex II
Risso's dolphin	*Grampus griseus*	Bern Convention, App. I Bonn Convention, App. II (North and Baltic Seas) CITES, App. II SPA/BD Protocol, Barcelona Convention, Annex II
Rough-toothed dolphin	*Steno bredanensis*	Bern Convention, App. I SPA/BD Protocol, Barcelona Convention, Annex II
Common bottlenose dolphin	*Tursiops truncatus*	Bern Convention, App. I Bonn Convention, App. II (North and Baltic Seas, Western Mediterranean) CITES, App. II EU Habitats Directive, Ann. II SPA/BD Protocol, Barcelona Convention, Annex II
	Tursiops truncatus ponticus	Bern Convention, App. I Bonn Convention, App. II CITES, App. II (0-quota for commercial export of wild-captured live individuals) EU Habitats Directive, Ann. II Provisional List of Species of Black Sea Importance, annexed to the Biodiversity and Landscape Conservation Protocol to the Bucharest Convention
Striped dolphin	*Stenella coeruleoalba*	Bern Convention, App. I Bonn Convention, App. II (Eastern Tropical Pacific, Mediterranean) CITES, App. II SPA/BD Protocol, Barcelona Convention, Annex II

Short beaked common dolphin	*Delphinus delphis*	Bern Convention, App. I Bonn Convention, App. I (Mediterranean), App. II (North and Baltic Seas, Mediterranean, Eastern Tropical Pacific) CITES, App. II SPA/BD Protocol, Barcelona Convention, Annex II
	Delphinus delphis ponticus	Bern Convention, App. I Bonn Convention, App. II CITES, App. II Provisional List of Species of Black Sea Importance, annexed to the Biodiversity and Landscape Conservation Protocol to the Bucharest Convention
Harbour porpoise	*Phocoena phocoena relicta*	Bern Convention, App. I Bonn Convention, App. II CITES, App. II EU Habitats Directive, Ann. II Provisional List of Species of Black Sea Importance, annexed to the Biodiversity and Landscape Conservation Protocol to the Bucharest Convention
	Phocoena phocoena phocoena	Bern Convention, App. I Bonn Convention, App. II (North and Baltic Seas, Western North Atlantic) CITES, App. II EU Habitats Directive, Ann. II SPA/BD Protocol, Barcelona Convention, Annex II

Table 6. International and regional conservation instruments listing cetacean species regular in the ACCOBAMS area.
In addition, all cetaceans are listed in Annex I to ACCOBAMS and Annex IV to the EU "Habitats" Directive.

A brief account of the species listed in tables 1-5 follows, in which the information provided in Notarbartolo di Sciara (2002b) is updated with knowledge obtained during the past eight years. This effort was in large part facilitated by the recent assessments made of the various species in view of the listing of the corresponding Mediterranean, Contiguous Atlantic and Black Sea populations in IUCN Red List.

• 5.1. Regular species

Fig. 1. Two fin whales *(Balaenoptera physalus)* surfacing in the waters of the Pelagos Sanctuary. Photograph by Caterina Lanfredi/Tethys Research Institute.

Common name	Fin whale
scientific name	*Balaenoptera physalus* (Linnaeus 1758)
Albanian	balene kokemahde
Arabic	شايع مراول (harcul chaii)
Croatian	veliki kit
French	rorqual commun
Greek	πτεροφάλαινα (pterofálaina)
Hebrew	לויתן מצוי (livyatan matzui)
Italian	balenottera comune
Maltese	baliena mbaððа
Portuguese	baleia-comum
Spanish	rorcual común
Turkish	uzun balina
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Mysticeti** Family: **Balaenopteridae** Genus: ***Balaenoptera***
world distribution	Cosmopolitan, but most frequent in cold temperate and sub-polar waters. Known to migrate extensively between cold productive waters (in summer) and tropical waters (in winter).

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania		●				
Algeria	●					
Bosnia and Herzegovina				●		
Croatia			●			
Cyprus	●					
Egypt	●					
France	●					
Gibraltar (UK)	●					
Greece	●					
Israel	●					
Italy	●					
Lebanon	●					

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya	●					
Malta	●					
Monaco	●					
Montenegro				●		
Morocco	●					
Palestinian Territory		●				
Portugal	●					
Slovenia			●			
Spain	●					
Syria	●					
Tunisia	●					
Turkey	●					

Distribution in the Mediterranean and Black Seas

Found mostly in deep, offshore waters of the western portion of the region, from the waters north and east of the Balearic Islands to and including the Ionian and southern Adriatic Seas. Extremely rare in the Adriatic, Aegean and Levantine seas, and absent from the Black Sea. The Corso-Ligurian Basin. the central Thyrrhenian, the Gulf of Lyon and the Catalan waters are the Mediterranean areas where fin whale abundance is highest by far (Notarbartolo di Sciara et al. 2003). Cotté et al. (2009) reported on the satellite tracking of eight whales, all of which remained in the Mediterranean over a period of 10 months, except one which moved into the Atlantic; spatial modelling results by the same authors confirmed year-round presence of fin whales in the north-western Mediterranean, with lower levels during winter. In fact, some fin whales are known to congregate in late February and early March in the Strait of Sicily, where they have been observed feeding on the euphausiid *Nyctiphanes couchii* (Canese et al. 2006). Acoustic detections, using seafloor autonomous recording units, monitored fin whale presence off the eastern and southern Mediterranean coasts of Spain, providing evidence of transit between a summer ground in the Corso-Ligurian Basin and a possible winter ground off southern Spain and the North African coast (Castellote et al. 2008). Movements thorough the Strait of Gibraltar assessed acoustically revealed a limited seasonal exchange of fin whales from the North Atlantic Ocean towards the Alborán Sea, with eastern movements recorded in the early winter and western ones in the early summer (Castellote et al. 2009). Evidence of acoustically different populations or stocks has been presented, with songs recorded in the Alborán Sea during the winter attributed only to the North-East North Atlantic population; no evidence of songs attributed to the Mediterranean subpopulation have been recorded (Castellote et al. 2009). Laran et al. (2008) used bathymetry, Chl-a, and SST to predict fin whale habitats in the northwestern Mediterranean, underlining favourable areas in the Tyrrhenian Sea, between the mainland of Italy and the Island of Sardinia, off the Pelagos Sanctuary borders. Presence of fin whales in this area has also been demonstrated by Arcangeli et al. (2009) and by opportunistic sightings.

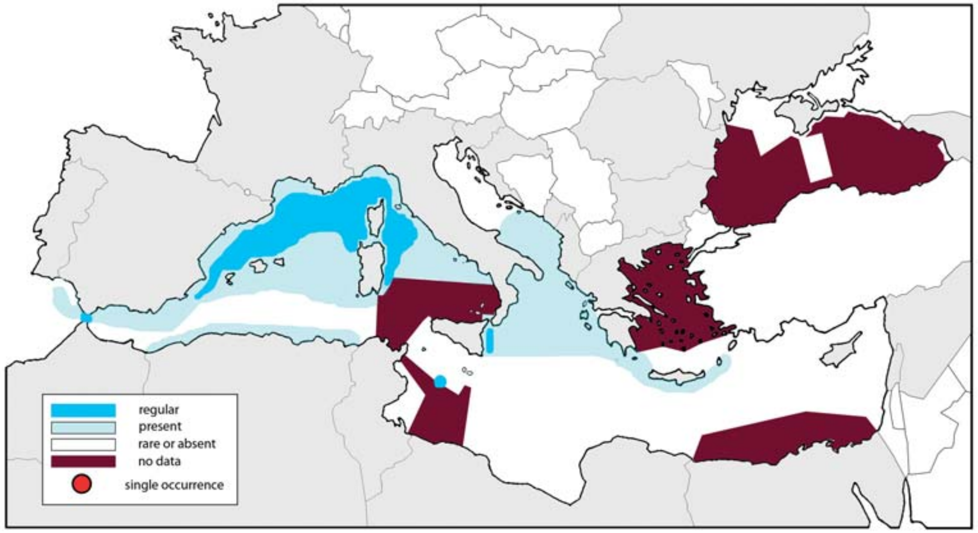


Fig. 2. Presumed distribution of *Balaenoptera physalus* in the ACCOBAMS area.

Habitat and ecology	Although they are found mainly in deep waters (400-2,500 m depth, most commonly at the deepest end of the range), offshore of the shelf edge, fin whales in the Mediterranean can also occur in slope and shelf waters, favouring upwelling and frontal zones with high zooplankton concentrations.
Population data	No population estimates exist for the entire region. Line-transect surveys in 1991 yielded fin whale estimates in excess of 3,500 individuals over a large portion of the western Mediterranean (Forcada et al. 1996), where most of the basin's fin whales are known to live. It is reasonable to assume that a realistic estimate for the total basin would not exceed 5,000 individuals. Genetic analyses based on both mitochondrial and nuclear DNA indicated differences between the Mediterranean population, thought to be resident, and North Atlantic fin whales (Bérubé et al. 1998). A sharp decrease in fin whale abundance has been observed in the Pelagos Sanctuary over the last decade, with estimates of 900 individuals reported from the western Ligurian Sea in 1992 (Forcada et al. 1995), declining to significantly lower numbers (N=147; CV=27.04%; 95% CI=86-250) in 2009 (Panigada et al. 2010). While the decrease of fin whales in the Pelagos Sanctuary may be due to whales relocating elsewhere within the Mediterranean, decrease in prime habitat must be addressed with precaution, and a population decline in the Mediterranean cannot be discounted at this time.
Status	The main threat to fin whale survival in the Mediterranean seems to be presented by ship strikes (Cagnolaro & Notarbartolo di Sciara 1992, Panigada et al. 2006, Weinrich et al. 2006). Secondary threats include bycatch in driftnets (Podestà & Magnaghi 1989), contamination by organic chemicals (Fossi et al. 1992), possibly unregulated whale watching (Airoldi et al. 1999) and global change (Gambaiani et al. 2009). Mediterranean fin whales have been proposed as Vulnerable VU C2aii in IUCN's Red List (Panigada & Notarbartolo di Sciara 2010) based on the following conditions: a) population genetically distinct from Atlantic fin whales, containing fewer than 10,000 mature individuals; b) population experiencing an inferred decline in numbers of mature individuals; and c) all mature individuals in one population.

Fig. 3. A large male sperm whale *(Physeter macrocephalus)* in the Pelagos Sanctuary. Photograph by Alessia Scuderi/Tethys Research Institute.

Common name	Sperm whale
scientific name	*Physeter macrocephalus* Linnaeus 1758
Albanian	kashalot
Arabic	عنبر (ambar)
Croatian	ulješura
French	cachalot
Greek	φυσητήρας (fysitíras)
Hebrew	ראשתן (roshtan)
Italian	capodoglio
Maltese	gabdoll
Portuguese	cachalote
Spanish	cachalote
Turkish	İspermeçet balinası, kaşalot
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Physeteridae** Genus: ***Physeter***
world distribution	Circumglobal and migratory. Most sperm whales shift towards higher latitudes in spring and summer, returning to temperate and tropical waters in autumn. Adult males range farther towards polar waters than females and young.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania	●					
Algeria	●					
Bosnia and Herzegovina				●		
Croatia			●			
Cyprus	●					
Egypt	●					
France	●					
Gibraltar (UK)	●					
Greece	●					
Israel	●					
Italy	●					
Lebanon	●					

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya	●					
Malta	●					
Monaco	●					
Montenegro		●				
Morocco	●					
Palestinian Territory		●				
Portugal	●					
Slovenia			●			
Spain	●					
Syria		●				
Tunisia	●					
Turkey	●					

Distribution in the Mediterranean and Black Seas	Widely distributed in the Mediterranean from the Gibraltar Strait area to the eastern basin. Known to be predictably present in parts of the Gibraltar Strait area, around the Balearic Islands, in the Algerian-Ligurian Basin, in the Tyrrhenian Sea, in the deep waters to the north, east and southeast of Sicily, in the Ionian Sea and along the Hellenic Trench from the northern Ionian Sea to the western Levantine Sea. Rare in the Strait of Sicily. Vagrant in the northern and central Adriatic Sea. Absent from the Black and Marmara Seas.

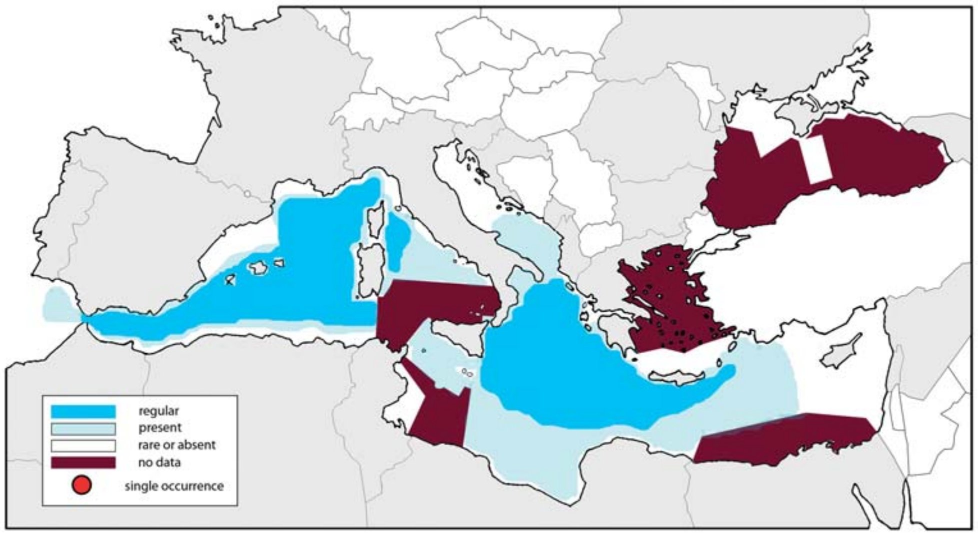


Fig. 4. Presumed distribution of *Physeter macrocephalus* in the ACCOBAMS area.

Taxonomical note	Although *Physeter catodon* is still occasionally used in the literature, *P. macrocephalus* is recommended (Rice 1998). Both names are listed on the same page of the original description by Linnaeus (1758), and priority is unclear. However, *P. macrocephalus* is preferable because it is used much more frequently, and this will support nomenclatural stability.
Habitat and ecology	Preferred sperm whale habitat in the Mediterranean consists mostly of deep continental slope waters where mesopelagic cephalopods, the species' preferred prey, are most abundant (Azzellino et al. 2008, Praca & Gannier 2008). Deeper offshore waters are also inhabited, but perhaps to a lesser degree (Praca & Gannier 2008). Sperm whale societies include social units of females with immature, and adult males which are known to segregate from females. In parts of the western and central Mediterranean males segregate during summer in the northern part (roughly north of 41° N), while social units remain in the south (Drouot et al. 2004), although the latter may be found occasionally in the north as well (Moulins & Wu¨rtz 2005, Di Meglio & David 2008, Pierantonio et al. 2008). In some parts of the eastern basin, social groups of females with immatures and solitary mature males are found in the same area year-round (Frantzis et al. 1999, 2003), although in the northern part of the Hellenic Trench only social groups are present and large males are rarely seen. When large males are present within social units, it is almost always in a reproductive context. Social groups typically consist of 7-12 individuals including at least 1-2 calves (Gannier et al. 2002). Information on the reproductive behaviour and ecology of sperm whales in the Mediterranean remains sparse. Some solitary males and several social units have been resighted in the same area for up to three and six consecutive years, respectively, during ongoing long-term studies (Frantzis et al. 2003; A. Frantzis, unpublished data). Both solitary males and social groups of sperm whales are thought to feed throughout their range.
Population data	Based on survey data collected in various portions of the Mediterranean in recent years, such as in the Strait of Gibraltar (de Stephanis et al. 2005b), northwestern portions of the Mediterranean, especially near the Gulf of Lions, and in portions the eastern Ionian Sea, especially off Greece (Gannier et al. 2002), the Ionian Sea (Lewis et al. 2006), a large portion of the western basin (from Gibraltar to Sicily and bounded on the north by a line from the Balearics east to Sardinia) (Lewis et al. 2006), and photo-identification studies conducted in the Hellenic Trench (A. Frantzis, unpublished data), the total number of sperm whales in the Mediterranean region is more likely in the hundreds than in the thousands. No evidence exists of population fragmentation across the region (D. Engelhaupt, pers. comm.).
Status	The most serious threat to sperm whales in the Mediterranean is entanglement in high-seas swordfish and tuna driftnets, which has caused considerable and likely unsustainable mortality since the mid-1980s (Notarbartolo di Sciara 1990; International Whaling Commission 1994), and is still ongoing (Tudela et al. 2003; ACCOBAMS 2003; Pace et al. 2008; Anon. 2008, Italian Cetacean Stranding Database 2010). Despite international and national regulations banning driftnets from the Mediterranean, illegal or quasi-legal driftnetting continues in sperm whale habitat, not only in the western Mediterranean (e.g., in Italy and Morocco: Oceana 2007) but recently also in the eastern basin (e.g., Greece and Turkey: Akyol et al. 2005), thereby continuing to threaten the species' survival in the region. In addition to bycatch, disturbance from intense marine traffic and collisions with large vessels (e.g. cargo ships, tankers, hydrofoils and high-speed ferries: de Stephanis et al. 2003, 2005), may be a significant source of mortality (Pesante et al. 2002). Underwater noise from mineral prospecting (seismic airguns), military operations, and illegal dynamite fishing are other sources of concern (Notarbartolo di Sciara & Gordon 1997, Frantzis et al. 2003, A. Frantzis, unpublished data). Based on considerations of threats, and on inference leading to the assumptions that a) Mediterranean sperm whales, which are genetically distinct, are fewer than 2,500 mature individuals, b) the population experiences an inferred continuing decline in numbers of mature individuals, and c) all mature individuals are in one undivided population (Drouot et al. 2004; Engelhaupt et al. 2009), the listing proposed for sperm whales in the Mediterranean in IUCN Red List was Endangered - EN C2a(ii) (Notarbartolo di Sciara et al. 2010).

Fig. 5. Cuvier's beaked whales *(Ziphius cavirostris)* in the Pelagos Sanctuary. Photograph by Federico Bendinoni/Tethys Research Institute.

Common name	Cuvier's beaked whale
scientific name	*Ziphius cavirostris* G. Cuvier 1823
Albanian	balene me sqep
Arabic	زيفيوس (zifius)
Croatian	Cuvierov kit
French	baleine de Cuvier, ziphius
Greek	ζιφιός (zifiós)
Hebrew	זיפיוס חלול- חרטום (zifyus chalul chartom)
Italian	zifio
Maltese	baliena ta' Kuvjer
Portuguese	zifio
Spanish	Zifio de Cuvier
Turkish	Kuvier balinasi
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Ziphiidae** Genus: ***Ziphius***
world distribution	Circumglobal; probably the widest-ranging ziphiid, absent only from polar waters. Like the other ziphiid species, its world distribution is known largely through the stranding record.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania	●					
Algeria	●					
Bosnia and Herzegovina		●				
Croatia	●					
Cyprus		●				
Egypt		●				
France	●					
Gibraltar (UK)	●					
Greece	●					
Israel	●					
Italy	●					
Lebanon		●				

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya		●				
Malta		●				
Monaco	●					
Montenegro		●				
Morocco	●					
Palestinian Territory		●				
Portugal	●					
Slovenia				●		
Spain	●					
Syria		●				
Tunisia		●				
Turkey	●					

Distribution in the Mediterranean and Black Seas

Cuvier's beaked whales inhabit both the western and eastern basins of the Mediterranean (Notarbartolo di Sciara 2002). Although much of the current knowledge of this species in the Mediterranean has come from stranding data, in recent years several targeted campaigns have disclosed hitherto unknown details of the species' ecology, both in the Mediterranean and elsewhere (see Section 7.2.1.2). Strandings have been reported in Albania, Algeria, Croatia, Egypt, France, Greece, Israel, Italy, Malta, Spain and Turkey; of the >300 animals thus recorded, about one quarter involved three or more individuals (Podestà et al. 2006). Cuvier's beaked whales are relatively abundant in the Alborán Sea (Cañadas et al. 2005), the remaining Spanish Mediterranean waters (Gannier 1999, Raga & Pantoja 2004, M. Castellote, pers. comm.), in the Ligurian Sea, especially over and around submarine canyons (D'Amico et al. 2003, Frantzis et al. 2003, Ballardini et al. 2005, Scalise et al. 2005, Azzellino et al. 2008), in the central Tyrrhenian Sea (Marini et al. 1992), the southern Adriatic Sea (Holcer et al. 2003) and the Hellenic Trench (Frantzis et al. 2003). The species was also reported from strandings and sightings in Israeli, Palestinian and Syrian waters (Aharoni 1944, Saad & Othman 2008, D. Kerem, pers. comm.). Absent from the Black and Marmara Seas.

Habitat and ecology

Predominantly an open sea species, often associated with deep slope, submarine canyon and escarpment habitat (D'Amico et al. 2003, MacLeod 2005, Podestà et al. 2006). Mean group size ranges between 2 and 3 (Cañadas et al. 2005, Ballardini et al. 2005, Scalise et al. 2005), except in the western Ligurian Sea where it is 4 (Azzellino et al. 2008). A Mediterranean-wide distribution of the species' habitat, constructed through spatial modeling based on sighting data associated with environmental variates, is expected to be completed by 2010 (A. Cañadas, pers. comm.)

Diet based on meso- and bathypelagic cephalopods (predominantly Histioteuthids), but may also include fish (MacLeod 2005).

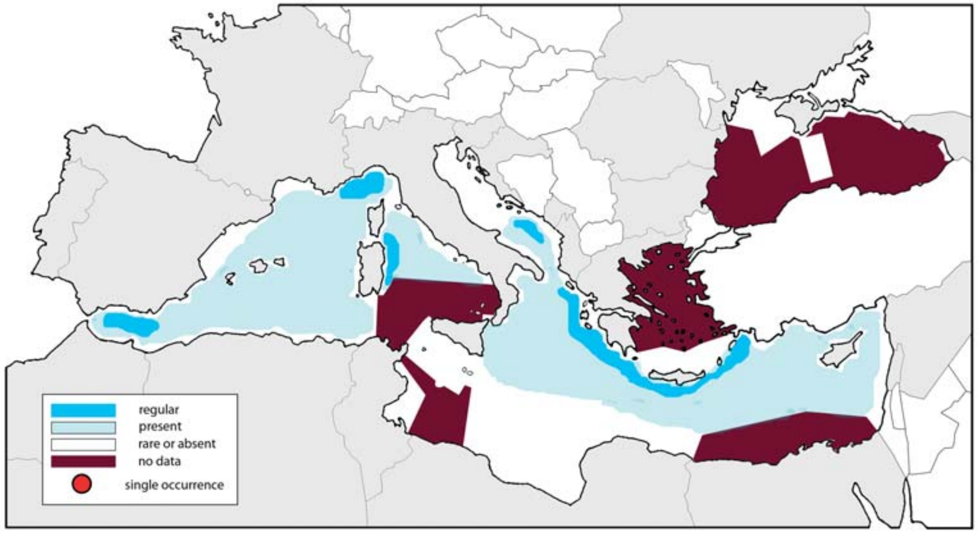


Fig. 6. Presumed distribution of *Ziphius cavirostris* in the ACCOBAMS area.

Population data	Population size and structure known only in two small areas: the Gulf of Genoa and the northern Alborán Sea. In the Gulf of Genoa mark-recapture analysis (2002-2008) yielded an estimate of 96-100 from an open population (Rosso et al. 2009). In the northern Alborán Sea, spatial modelling of line transect data (1992-2007) yielded and abundance estimate of 102 (Oedekoven et al. 2009). Abundance estimates for the whole Alborán Sea and the northern Tyrrhenian Sea will be available in late 2010 after analysis of the Sirena08 and MED09 survey cruises. Preliminary inspection of the data from such cruises highlights a high density, compared to most areas of the world where the species has been observed (Cañadas 2010a). There is no information on population trends in the Mediterranean. The Mediterranean population is genetically distinct from neighbouring populations in the eastern North Atlantic (Dalebout et al. 2005). Surveys conducted, respectively, in the Strait of Gibraltar since 1998 (de Stephanis et al. 2005b) and in the western section of the Alborán Sea since 2000 (A. Cañadas, unpublished data), failed to record a single sighting of this species, supporting the hypothesis of little or no occurrence in or movement through the Strait. On such bases Cuvier's beaked whales in the Mediterranean are currently considered a geographical subpopulation (Cañadas 2010a).
Status	Proposed as Data Deficient (Cañadas 2010a) because minimum information on biology, distribution, population structure and abundance throughout the Mediterranean is still insufficient. Due to their offshore occurrence and tendency to feed on deep-sea squid, Cuvier's beaked whales are probably marginally exposed to human activities in the coastal zone. However, threats to Cuvier's beaked whale survival in the Mediterranean are known to exist. These include, most notably, mortality caused by anthropogenic sound, and bycatch in driftnets; ingestion of solid debris may also impact on the population. Military sonar and seismic surveys have repeatedly resulted in strandings and deaths of Cuvier's beaked whales (e.g. Frantzis 1998). Use of military sonar has caused strandings of beaked whales suffering from tissue damage due to the in vivo formation of gas bubbles, possibly the result of decompression sickness (Jepson et al. 2003; Fernández et al. 2005). Although the population-level implications of the use of military sonar are uncertain, there is evidence suggesting that they could be at least locally significant (Cañadas 2010a). Cuvier's beaked whales are occasionally taken incidentally in driftnets in the Mediterranean Sea (Notarbartolo di Sciara 2000, A. Canadas pers. comm.). Stranded animals are occasionally found with their digestive traits full of plastic material (Poncelet et al. 1999), including in the Mediterranean (Holcer et al. 2006, A. Frantzis, pers. comm.).

Fig. 7. A large male killer whale *(Orcinus orca)* in the Strait of Gibraltar. Photograph by Marco Barbate/CIRCE.

Common name	Killer whale
scientific name	*Orcinus orca* (Linnaeus 1758)
Arabic	أُرْكة (arqa)
Croatian	orka, kit ubojica
French	orque, épaulard
Greek	όρκα (orka)
Hebrew	קטלן (katlan)
Italian	orca
Maltese	orka
Portuguese	orca
Spanish	orca, esparte
Turkish	katil balina
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Orcinus***
world distribution	Circumglobal, with a preference for colder waters.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania						
Algeria						
Bosnia and Herzegovina						
Croatia						
Cyprus						
Egypt						
France			●			
Gibraltar (UK)	●					
Greece						
Israel					●	
Italy			●			
Lebanon						

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya						
Malta			●			
Monaco			●			
Montenegro						
Morocco	●					
Palestinian Territory						
Portugal		●				
Slovenia						
Spain	●		●			
Syria						
Tunisia						
Turkey						

Distribution in the Mediterranean and Black Seas

Regular in the Strait of Gibraltar and Contiguous Atlantic.

Visitor to the western Mediterranean, vagrant to the eastern Mediterranean, with only one uncertain report from the eastern basin (see Table 7 for details of known occurrences in the region).

Absent from the Black Sea.

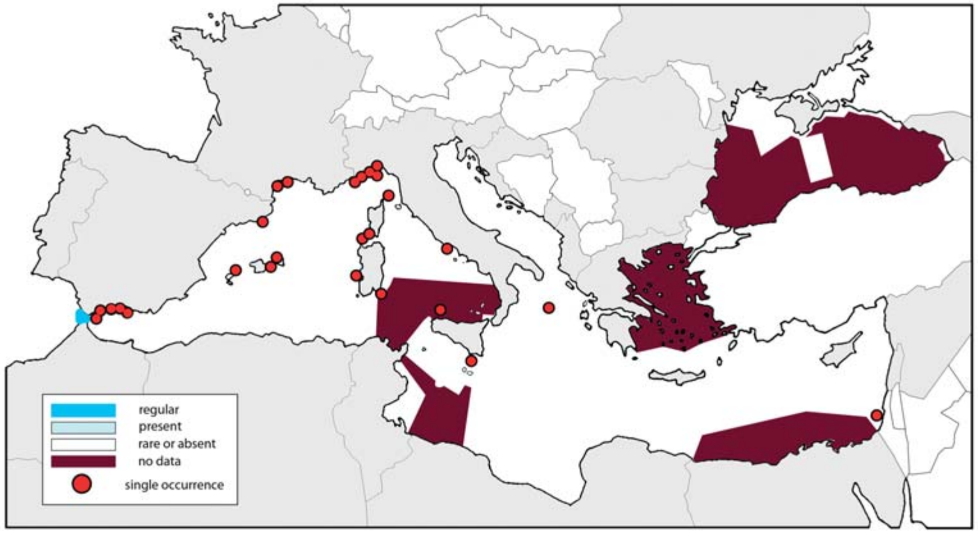


Fig. 8. Presumed distribution and known occurrences of *Orcinus orca* in the ACCOBAMS area (details in Table 7).

Habitat and ecology	Although *O. orca* is one of the world's mammals having the widest distribution – from polar to tropical waters and from inshore bays to the open ocean – the species is found preferably in colder waters and over the continental shelf. Killer whales found in the Strait of Gibraltar and Contiguous Atlantic live in shallow water, 20-300 m deep (de Stephanis 2005, de Stephanis et al. 2005a). Gibraltar Strait killer whales are known to feed primarily on bluefin tuna *(Thunnus thynnus)* during summer. Their diet in other seasons is still unknown (Cañadas & de Stephanis 2010).
Population data	Based on ongoing photo-identification studies started in 1999, the Gibraltar "population" was estimated at 32 individuals, subdivided into three different pods (de Stephanis et al. 2002, 2005a, 2005b). Although the possibility of gene flow and demographic interchange with North Atlantic conspecifics cannot be ruled out, based on the small population size, high degree of residency, and lack of observations of other 'transient' animals, Gibraltar killer whales are treated in Cañadas & de Stephanis (2010) as a geographical population. No viable populations are known to reside in the Mediterranean and Black Seas.
Status	Gibraltar killer whales are threatened primarily by prey depletion (their main prey, bluefin tuna, being strongly depleted in the region); direct killing by fishermen who compete with the whales for a plummeting prey; and habitat degradation, such as the construction of wind farms in prime killer whale habitat (Cañadas & de Stephanis 2010). Toxic pollutants, noise and disturbance from a growing whale watching industry are also potential, still little investigated threats. Based on small population size (<50 mature individuals), and continuing decline in numbers according to reports of killings by Moroccan fishermen and photo-ID data, the Gibraltar population is being proposed as Critically Endangered - CR C2a(i, ii), D (Cañadas and de Stephanis 2010).

Date	Location	Sex	Size	Notes	Reference
No date	Near Sète, France			Cranium of a captured specimen, reportedly in the Museum of Paris	Van Beneden 1889
No date	Unknown, but supposedly Mediterranean			Cranium in the Museum of Marseille	Duguy and Cyrus 1976
No date	Mediterranean			Two crania in the museum of Palermo, Sicily	Giglioli 1880
No date	Asinara Island, Sardinia, Italy			Cranium in the museum of Florence	Notarbartolo di Sciara 1987
No date	Between Sicily and Malta			One specimen reportedly captured	Cornalia 1870
No date	"coast of Israel"				Marchessaux 1980 quoting Bodenheimer 1960
Mid-XIX cent.	Palavas, France			Cranium of a stranded juvenile, reportedly in the Museum of Paris	Van Beneden 1889, Bompar 2000
1896 (27 May)	Off Monaco	F	4.10-5.9 m	Two females captured from a pod of three	Albert, Prince of Monaco 1898, Richard and Neuville 1936
1897 (17 Jun)	Mediterranean waters near Gibraltar, Spain			Sighting of an adult and two young	Casinos and Vericad 1976 citing Richard 1936
1902 (22 Jul)	Mediterranean waters near Gibraltar, Spain	F	4.7 m	Captured	Casinos and Vericad 1976 citing Richard 1936
1914 (?)	Mediterranean waters near Gibraltar, Spain		Adult		Casinos and Vericad 1976 citing Cabrera 1914
1926 (15 May)	El Prat de Llobregat, Barcelona, Spain		5.3 m	Captured	Anon. 1926
1941 (26 Dec)	Cap de Tera, Majorca, Spain		5.3 m	Stranded when pursuing a school of dolphins	Casinos and Vericad 1976 citing Navarro 1943
About 1966	Sa Torreta, Minorca, Spain		A little longer than 6 m	Stranded	Casinos 1981
1970s	Ionian Sea			Pod sighted from Italian research vessel "Bannock", description unambiguous	Pers. comm. from Gilberto Gandolfi in Notarbartolo di Sciara 1981
1972 (Jun)	Scopello, Palermo, Italy			Bycaught in traditional fixed tuna trap	Di Natale and Mangano 1983

1974 (15 Feb)	Off Cap Feno, Corsica, France			Floating carcass reported	Duguy 1975, Hammond and Lockyer 1988
1984 (27 Jun)	E of Capo Carbonara, Sardinia, Italy			Pod of 3 sighted	Raga et al. 1985, Hammond and Lockyer 1988
1985 (14 Aug)	75 km SE of San Remo, Italy		About 5 m	Individual sighted and photographed	Notarbartolo di Sciara 1987
1985 (16 Aug)	30 km S of San Remo, Italy			Pod of two sighted and filmed, one recognised as specimen of 14 Aug. 1986	Notarbartolo di Sciara 1987
1985 (1 Oct)	30 km S of Finale Ligure, Italy			Same specimen as the one sighted on 14 and 16 Aug. 1985, photographed feeding on a *Ziphius* carcass	Notarbartolo di Sciara 1987
1987 (Jul)	Between the islands of Ponza and Ventotene, Italy			Pod of about 12 sighted, filmed	Bompar 2000
1990 (7 Aug)	Maro, Malaga, Spain		5.3 m	Stranded	Aguilar et al. 1997
1990 (9 Dec)	Salobreña, Granada,Spain		5.5 m	Stranded	Aguilar et al. 1997
1991 (8 May)	Marbella, Malaga, Spain	F	5.25 m	Stranded	Gil-de-Sola Cimarro 1992
1991 (5 Jul)	Marbella, Málaga, Spain		5.6 m	Stranded	Aguilar et al. 1997
1991 (15 Sep)	Fuengirola, Malaga, Spain	F	3.5 m	Stranded	Gil-de-Sola Cimarro 1992
1991 (Sep)	NE of Corsica			Pod of 4 sighted	Bompar 2000
1992 (15 Mar)	2 n.m. of Cape Sicié, Var, France			Pod of 6 sighted	Bompar 2000
2010 (15 Sep)	About 5 n.m. WNW of Punta Senetosa, Corsica			Pod of ≥ 6 sighted, with young	Michael Woodman-Smith, pers. comm. (abundant documentation available)

Table 7. Known occurrences of *Orcinus orca* in the Mediterranean (adapted from Reeves and Notarbartolo di Sciara 2006, with subsequent additions). Note: Uncertain events and reports were not listed due to lack of minimal documentation: (a) an account given by Pliny the Elder of a killer whale captured by the emperor Claudius in the harbour of Ostia in the first century A.D (Pliny the Elder 1983); (b) a doubtful capture reported by L. Companyo during the XIX cent. near Canet, Pyrénés-Orientales (Bompar 2000); (c) an occurrence in Malta mentioned without further detail by Tomilin (1967); (d) undocumented sightings reported by amateurs or casual observers to Di Natale and Mangano (1983), McBrearty et al. (1986) and Beaubrun (1995); (e) mentions of killer whale occurrences by Duguy et al. (1983a, b), with no detail provided; (f) undocumented sightings by Folco Quilici, pers. comm. to Notarbartolo di Sciara (1987).

Fig. 9. In a typical spyhopping behaviour, a long-finned pilot whale *(Globicephala melas)* in the Strait of Gibraltar observes its photographer. Photograph by David Alarcón/CIRCE.

Common name	Long-finned pilot whale
scientific name	*Globicephala melas* (Traill 1809)
Arabic	الشائع الرأس كروي (kouraoui arras achaii)
Croatian	bjelogrli dupin
French	globicéphale noir, dauphin pilote
Greek	μαυροδέλφινο (mavrodélfino)
Hebrew	נתב שחור (natav shachor)
Italian	globicéfalo
Maltese	baliena sewda
Portuguese	cachalote-anão
Spanish	calderón negro, calderón común, ballena piloto
Turkish	siyah yunus
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Globicephala***
world distribution	Found in cold and medium-temperate waters of the North Atlantic and of the Southern Hemisphere.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania				●		
Algeria	●					
Bosnia and Herzegovina				●		
Croatia				●		
Cyprus				●		
Egypt				●		
France	●					
Gibraltar (UK)	●					
Greece				●		
Israel				●		
Italy	●		● (Adriatic)			
Lebanon				●		

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya				●		
Malta						
Monaco	●					
Montenegro				●		
Morocco	●					
Palestinian Territory				●		
Portugal	●					
Slovenia				●		
Spain	●					
Syria				●		
Tunisia	●					
Turkey				●		

Distribution in the Mediterranean and Black Seas

Common in the western portion of the Mediterranean basin (Alborán and Balearic Seas), and present in lower densities in the Contiguous Atlantic Area. Its presence east of Italy is extremely rare (Marchessaux & Duguy 1978, Frantzis et al. 2003). A small pod was sighted and photographed in the Adriatic off Cattolica (Italy) in May 2010 (M. Affronte, in litt.), and a floating carcass, possibly of a pilot whale, was reported from the Gulf of Taranto (Centro Studi Cetacei 1996).

Absent from the Marmara and Black Seas.

Fig. 10. Presumed distribution of *Globicephala melas* in the ACCOBAMS area.

Habitat and ecology	In the Mediterranean long-finned pilot whales are most frequently found in offshore, deep waters (Notarbartolo di Sciara et al. 1993, Gannier 1995, Raga & Pantoja 2004, Cañadas et al. 2005). They are highly social animals, with a mean group size of 30 in the western Mediterranean (Cañadas et al. 2005), decreasing to 10-11 off eastern Spain (Raga and Pantoja 2004) and Italy (Notarbartolo di Sciara et al. 1993). Predominantly teuthophagous, but occasionally feeding on pelagic fishes (Relini & Garibaldi 1992, Cañadas et al. 2005).
Population data	Estimates of abundance based on photo-identification studies, started in 1999, only exist for the Strait of Gibraltar, where 249-270 individuals are thought to be resident (Verborgh 2005, de Stephanis et al. 2005b, Verborgh et al. in press). In the Alborán Sea, where encounter rates are higher than in any other part of the Mediterranean, numbers are thought to be comprised between several hundreds and a few thousands (Cañadas & Sagarminaga 2000). Long-finned pilot whale population structure in the Mediterranean is unknown, the working assumption being that there is a single subpopulation in the region (Cañadas 2010b).
Status	Due to their oceanic habits and teuthophagous diet, long-finned pilot whales in the Mediterranean are likely to be less impacted by human activities than more coastal cetacean species. Threats include bycatch, mostly in pelagic driftnets (Northridge 1984, Notarbartolo di Sciara 1990); ship strikes (de Stephanis, pers. comm. to Ana Cañadas; Pesante et al. 2002); toxic pollution; morbillivirus infection (Fernandez et al. 2008); and anthropogenic noise (Rendell & Gordon 1999). Given the dearth of adequate information on the species' biology, distribution and abundance in most of the Mediterranean, which prevents detection of potential negative trends, long-finned pilot whales in the Mediterranean were assessed as Data Deficient (Cañadas 2010b).

Fig. 11. Risso's dolphins *(Grampus griseus)* swimming in the Pelagos Sanctuary. Photograph by Caterina Lanfredi/Tethys Research Institute.

Common name	Risso's dolphin
scientific name	*Grampus griseus* (G. Cuvier 1812)
Arabic	غرامبوس (ghrambous)
Croatian	glavati dupin
French	dauphin de Risso
Greek	σταχτοδέλφινο (stachtodélfino)
Hebrew	גרמפוס (grampus)
Italian	grampo
Maltese	delfin griú
Portuguese	grampo
Spanish	calderón gris, delfín de Risso
Turkish	grampus
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Grampus***
world distribution	Circumglobal in temperate and tropical seas, roughly between Lat. 60° N and 60° S.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania		●				
Algeria	●					
Bosnia and Herzegovina				●		
Croatia			●			
Cyprus		●				
Egypt		●				
France	●					
Gibraltar (UK)		●				
Greece	●					
Israel	●					
Italy	●					
Lebanon		●				

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya		●				
Malta	●					
Monaco	●					
Montenegro		●		●		
Morocco		●				
Palestinian Territory		●				
Portugal		●				
Slovenia			●			
Spain	●					
Syria		●				
Tunisia		●				
Turkey		●				

Distribution in the Mediterranean and Black Seas

Found throughout the Mediterranean where the species' preferred habitat occurs. Apparent areas of higher concentration of Risso's dolphins (e.g., northern Alborán Sea, Ligurian-Corso-Provencal basin) are probably a result of heterogeneous observation effort. Not uncommon along the northern shores of the western Mediterranean, Balearic, Ionian (including the Gulf of Taranto), and western Aegean seas. One animal was recorded stranded on the Turkish coast of the northern Aegean Sea (Tonay et al. 2009). Sighted off Israel. Occasionally strays into the northern Adriatic. No data are available for the southern Mediterranean Sea.

Absent from the Marmara and Black Seas.

Habitat and ecology

Risso's dolphins in the Mediterranean are known to prefer deep waters and shelf break areas where the slope is steepest, which brings them close to the coast where the shelf is narrow, such as in western Liguria, western Corsica and south-eastern France (Notarbartolo di Sciara et al. 1993, Cañadas et al. 2002, Azzellino et al. 2008, Bearzi et al. 2010c). Site fidelity was observed in Risso's dolphins found in the western Ligurian Sea, based on a long-term photoidentification study (Airoldi et al. 2005). Risso's dolphins in the western Mediterranean feed mostly on oceanic cephalopods found in the middle slope (600-800 m); species include the pelagic octopod *Argonauta argo* and various ommastrephid, histioteuthid and onychoteuthid squids (Blanco et al. 2006). Group size is variable, ranging from a few individuals to >60 (mean= 16.7: Notarbartolo di Sciara et al. 1993), mostly with weak associations but also with long-term relationships between individuals (Gaspari 2004).

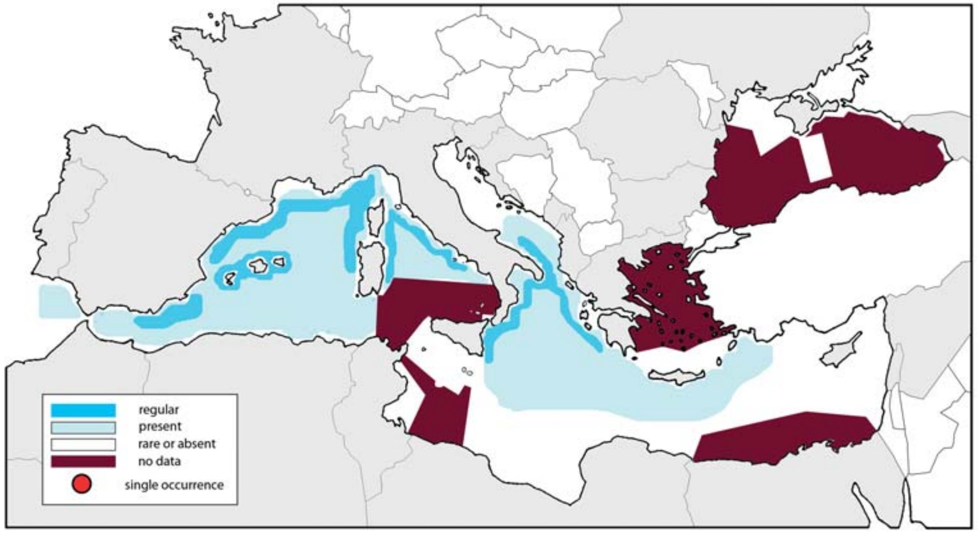


Fig. 12. Presumed distribution of *Grampus griseus* in the ACCOBAMS area.

Population data	No population estimates exist for this species in the Agreement area, and therefore no population trends are known (Bearzi et al. 2010c). Abundance estimates exist for very limited portions of the region: e.g., aerial surveys from 2001-03 resulted in an estimate of 493 Risso's dolphins (95% C.I. 162-1,498) in an area of 32,270 km^2 off eastern Spain (Gómez de Segura et al. 2006). Risso's dolphins in the Mediterranean are genetically differentiated from those in the eastern Atlantic, implying that the Mediterranean animals are distinct; there is also some evidence of structuring within the Mediterranean (Gaspari et al 2007a).
Status	The main known threat to Risso's dolphins in the Mediterranean is entanglement in pelagic driftnets (Notarbartolo di Sciara 1990, Bearzi et al. 2010) and longlines (Valeiras & Camiñas 2001); other potential problems include disturbance (e.g., Miragliuolo et al. 2001) and ingestion of plastic debris (Bearzi et al. 2010c). Furthermore, like other odontocetes, Risso's dolphins in the Mediterranean may carry substantial contaminant burdens (Marsili & Focardi 1997, Shoham-Frider et al. 2002). In spite of known threats, no evidence exist of population decline of Risso's dolphins in the Mediterranean, and the population was assessed as Data Deficient in a proposal for inclusion in the IUCN Red List (Gaspari & Natoli 2010a).

Fig. 13. A large pod of rough-toothed dolphins *(Steno bredanensis)* inside the harbour of Haifa, Israel, 22 March 2005. Photograph by Mia Elasar/IMMRAC.

Common name	Rough-toothed dolphin
scientific name	*Steno bredanensis* (G. Cuvier in Lesson 1828)
Arabic	ستينو (steno)
French	steno, dauphin à bec étroit
Greek	στενόρυγχοδελφίνι (stenóryncho delfíni)
Hebrew	התיכון - ים דולפינן (dolphin tlum-shinaim)
Italian	steno
Maltese	delfin tat-tikki
Portuguese	caldeirão
Spanish	delfin de dientes rugosos
Turkish	kaba diği yunus
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Steno***
world distribution	Circumglobal in tropical and warm-temperate waters, preferably where surface temperature exceeds 25°C (although recent data supports tolerance for colder conditions).

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania				●		
Algeria				●		
Bosnia and Herzegovina				●		
Croatia				●		
Cyprus	●					
Egypt		●				
France			●			
Gibraltar (UK)				●		
Greece		●				
Israel	●					
Italy	●					
Lebanon	●					

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya	●					
Malta		●				
Monaco				●		
Montenegro				●		
Morocco		● (Contiguous Atlantic)		●		
Palestinian Territory		●				
Portugal				●		
Slovenia				●		
Spain		● (Contiguous Atlantic)		●		
Syria		●				
Tunisia				●		
Turkey		●				

Distribution in the Mediterranean and Black Seas

Formerly considered visitor to the Mediterranean Sea (e.g., Notarbartolo di Sciara 2002b, Reeves & Notarbartolo di Sciara 2006), it is now tentatively proposed as regular in the eastern Mediterranean (but retaining the status of visitor to the western Mediterranean) in consideration of the frequency of sightings and strandings of this species in this part of the region, as evidenced by recent monitoring activities (see Table 8).

Absent from the Marmara and Black Seas.

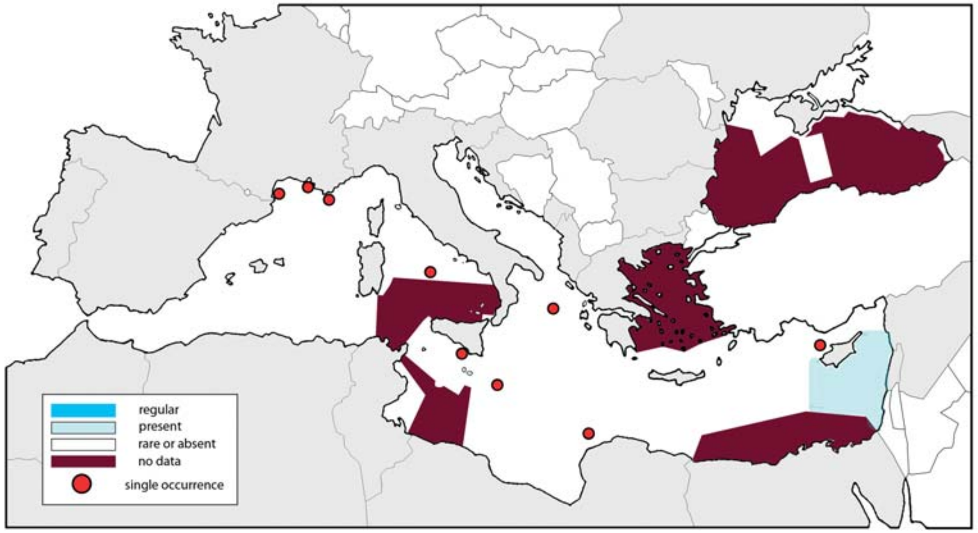


Fig. 14. Presumed distribution and known occurrences of *Steno bredanensis* in the ACCOBAMS area (details in Table 8).

Habitat and ecology	Found in oceanic waters, above and beyond the shelf break, and over the continental shelf in parts of the species' range. In the Mediterranean it has been observed both in coastal and pelagic waters. Lives in groups of variable sizes, from <10 to >100. The species' diet includes cephalopods and fishes, including large-sized species that are broken into pieces before swallowing.
Population data	No information is available on population size in the Mediterranean Sea.
Status	The Mediterranean population was not assessed for IUCN's Red List. Instances are known of S. *bredanensis* in the Mediterranean having been bycaught in gillnets. In addition, an episode of mass live stranding (Cyprus, 2010) is suggestive of disturbance of an unknown nature. Strandings in Israel have been more frequent in late winter – early spring. Until its relationship to oceanic conspecifics is determined, this putative population's likely condition of isolation suggests that it may be subject to a high level of threat.

Date	Location	Sex	Size	Notes	Reference
unknown	Tyrrhenian Sea, Italy			Cranium in the collections of the museum of Florence	Giglioli 1880
unknown	Gulf of Marseilles, France			Cranium in the collections of the museum of Marseilles	Robineau 1975
1926	Near Embiez islands, Toulon, France			By-caught, not preserved, but identification certain	Robineau 1975 citing Neuville 1927
1949 (?)	Haifa, Israel			Cranium in the collections of the British Museum	Marchessaux & Duguy 1978
1970 (Sep)	Gulf of Aigues-Mortes, France	F	2.35 m	Captured in tuna net	Granier 1970-1972
1985 (4 Sep)	Ionian Sea, 170 km south of Sicily			Aggregation of about 160 sighted, photographed and acoustically recorded	Watkins et al. 1987
1997 (16 Mar)	3 km north of the Gaza Strip border, Israel	M		Stranded calf	Dani Kerem, in litt.
1998 (1 Mar)	Between Jaffa and Tel Aviv, Israel	M		Stranded calf	Dani Kerem, in litt.
1998 (13 Apr)	25 km south of Haifa, Israel	F		Stranded subadult	Dani Kerem, in litt.
2002 (16 Feb)	Atlit shore, Israel	M		Subadult stranded dead, after having been bycaught	Oz Goffman, in litt.
2002 (5 Apr)	Donnalucata, Ragusa, Italy	4 M 2 F	1.99 – 2.42 m	6 stranded alive; 3 died, 3 released alive	Centro Studi Cetacei 2004
2003 (9 Mar)	Carmel Beach, Haifa, Israel	F	1.60 m	Calf entangled in gillnet, still nursing but starting to take solids (fish, cephalopods)	Goffman et al. 2006
2003 (20 Mar)	Nahariyya Beach, Israel	M	1.91 m	Stranded, partly decomposed	Goffman et al. 2006
2003 (Sep)	Ionian Sea, about 150 km west of Kefalonia, Greece			Group of 8 sighted, photo documentation available	Lacey et al. 2005

2005 (22 Mar)	Port of Haifa, Israel			Group of about 30, remaining in the harbour and feeding on mullet all day (copious documentation available)	Kerem 2005
2006 (14 Mar)	Nahariyya Beach, Israel	F	1.87 m	Stranded, partly decomposed	Goffman et al. 2006
2007 (Jun)	off northwestern Cyprus			sighting	Boisseau et al. 2010
2007 (Summer)	off Cyrenaica, Libya			sighting	Boisseau et al. 2010
2007 (21 May)	off Jounieh, Lebanon			sighting	Gaby Khalaf, pers. comm.
2008 (4 Mar)	Tyre, Lebanon	2 F	2.00 – 2.40 m	bycaught in gillnet targeting thunnids. Foetus (0.9 m, 7 kg, sex unkn.) found in larger female	J. Gonzalvo, in litt.
2010 (10 Mar)	Limassol, Cyprus			Group of about 20 stranded alive, returned to sea (copious documentation available)	A. Demitropoulos, pers. comm.

Table 8. Known occurrences of *Steno bredanensis* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006, with subsequent additions). Note: Uncertain events and reports were not listed in the table above, due to lack of minimal documentation: (a) an unsubstantiated personal communication by R. Busnel to Collet (1984) of “about 10” roughtoothed dolphins taken in the Mediterranean Sea in the 1950s, on behalf of the Laboratoire de Physiologie Acoustique in France; (b) non-documented sightings reported by nonspecialists in the Gulf of Taranto (Ionian Sea) and Strait of Sicily (Di Natale 1983); and (c) non-documented sightings in the Strait of Gibraltar (Hashmi & Adloff 1991).

Fig. 15. A common bottlenose dolphin *(Tursiops truncatus)* leaps in the calm waters of the Amvrakikós Gulf, Greece. Photograph by Giovanni Bearzi/Tethys Research Institute.

Common name	Common bottlenose dolphin
scientific name	*Tursiops truncatus* (Montagu 1821)
Albanian	delfin i madh
Arabic	دلفين كبير (delfin kabir)
Croatian	dobri dupin
French	grand dauphin, dauphin souffleur
Greek	ρινοδέλφινο (rinodélfino)
Hebrew	דולפינן ים- התיכון (dolphinan yam hatichon)
Italian	tursìope
Maltese	delfin geddumu qasir
Portuguese	roaz-corvineiro
Spanish	delfín mulár
Turkish	afalina
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Tursiops***
world distribution	A circumglobal, widely distributed dolphin species, found in tropical and temperate waters of all oceans, as well as in semi-enclosed seas such as the Gulf of Mexico, the Gulf of California, and the Mediterranean, Black and Red Seas. The species consists of two ecotypes, one coastal and the other oceanic, with different morphological and ecological characteristics.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania		●				
Algeria	●					
Bosnia and Herzegovina		●				
Croatia	●					
Cyprus	●					
Egypt		●				
France	●					
Gibraltar (UK)	●					
Greece	●					
Israel	●					
Italy	●					
Lebanon	●					

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya	●					
Malta	●					
Monaco		●				
Montenegro	●					
Morocco	●					
Palestinian Territory		●				
Portugal	●					
Slovenia	●					
Spain	●					
Syria		●				
Tunisia	●					
Turkey	●					

Distribution in the Mediterranean and Black Seas

The commonest cetacean throughout the Mediterranean Sea continental shelf, where its distribution appears today to be scattered and fragmented into small units, likely due to anthropogenic habitat degradation. Range includes inshore, coastal and offshore waters to near the continental slope.

The species is also regular in the Black Sea (and possibly the Marmara Sea), represented there by a different subspecies, *T. truncatus ponticus* Barabash-Nikiforov 1940 (see p. 51).

Habitat and ecology

Considered mainly coastal (including lagoons, semi-enclosed bays and estuaries) in the Agreement area, the species can be regularly found in deeper waters above the shelf break, e.g., in the western Mediterranean (Forcada et al. 2004, Cañadas & Hammond 2006) and on the Tunisian Plateau (Ben Naceur et al. 2004). Common bottlenose dolphins live in small groups averaging 7 individuals in coastal areas (Bearzi et al. 1997, Ben Naceur et al. 2004); however when found in more offshore waters their group size tends to be much greater (Forcada et al. 2004, Cañadas & Hammond 2006).

Common bottlenose dolphins in the Mediterranean feed on a large variety of fish and cephalopod species, with a preference for demersal prey (Blanco et al. 2001), but also including epipelagic fishes, depending on location and circumstances. They frequently interact with fishing and aquaculture activities (e.g., Lauriano et al. 2004, Dìaz Lòpez 2005), and can spend up to 5% of their time following trawlers (Bearzi et al. 1999).

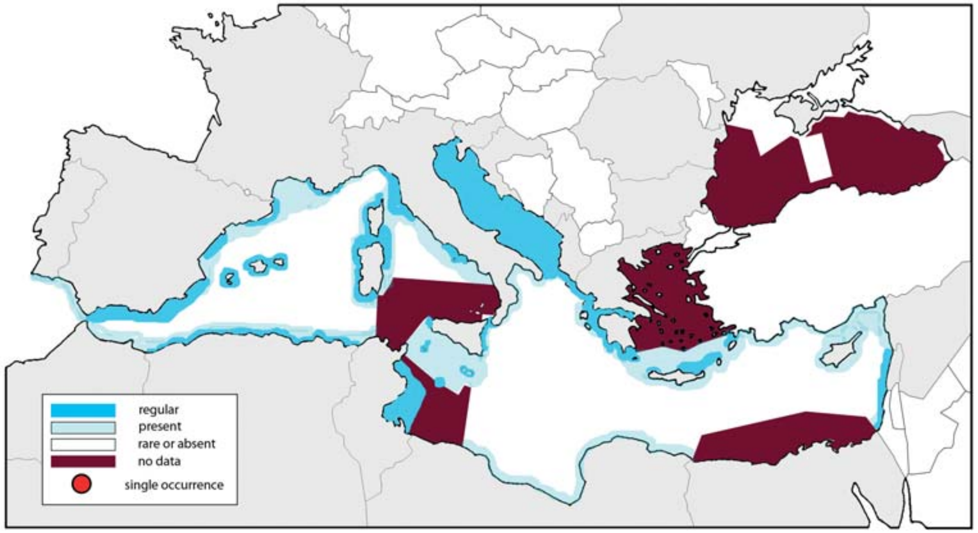


Fig. 16. Presumed distribution of *Tursiops truncatus* in the ACCOBAMS area.

Population data	There is no basin-wide abundance estimate for Mediterranean common bottlenose dolphins, with quantitative knowledge deriving from a handful of local studies (e.g., Israel, Tunisia, northern Adriatic Sea, Ligurian Sea, Balearic Sea, Alborán Sea, and several other small portions of the Italian, French and Spanish coasts). Therefore, total population size is unknown, but may be in the low 10,000s based on observed densities in the studied areas (Bearzi & Fortuna 2010). Data obtained from a long-term study in the northern Adriatic Sea provide an indication of population trends in the region (= a decline by >50% over the past 50 years, largely as a consequence of historical killing, followed by habitat degradation and overfishing: Bearzi et al. 2004). Fortuna (2006) detected a significant population decline between 1995 and 2003 in a more circumscribed area of the north-eastern Adriatic. Population structure based on genetics (Natoli et al. 2005) and toxicology and diet (Borrell et al. 2005) is evident in the region's common bottlenose dolphins, with three possible ecological boundaries across the Mediterranean based on mitochondrial DNA differences: the Gibraltar strait, the Almería-Oran front and the Strait of Sicily.
Status	Due to their predominant presence in coastal waters, common bottlenose dolphins are particularly subject to negative human influence (Bearzi & Fortuna 2010). Threats include a) reduced availability of prey caused by overfishing and environmental degradation (Bearzi et al. 1999, 2005, 2006); b) incidental mortality in fishing gear (Silvani et al. 1992, Bearzi 2002, Bearzi et al. 2004, Gazo et al. 2004); and c) toxic effects of xenobiotic chemicals, which may be present in the dolphins at very high levels (Corsolini et al. 1995, Aguilar et al. 2002, Fossi and Marsili 2003). The Mediterranean population of common bottlenose dolphins was proposed as **Vulnerable** A2c,d,e (Bearzi & Fortuna 2010) based on the following: a) past and continued substantial incidental mortality in fishing gear, b) habitat loss or degradation including overfishing of prey, and c) high levels of contamination.

Fig. 17. Two Black Sea bottlenose dolphins *(Tursiops truncatus ponticus).* Photograph by Sergey Krivokhizhin/Brema Laboratory.

Common name	Common bottlenose dolphin, Black Sea subspecies (Black Sea bottlenose dolphin)
scientific name	*Tursiops truncatus ponticus* Barabash-Nikiforov 1940
Bulgarian	afala, puchtun
Georgian	afalini
Romanian	afalin, delfin cu bot de sticlă, delfin cu bot gros
Russian	черноморская афалина (chernomorskaya afalina)
Turkish	afalina
Ukrainian	чорноморська афаліна (chornomors'ka afalina)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Tursiops*** Species: ***Tursiops truncatus***
world distribution	The subspecies, confirmed by genetic and morphometric studies (Natoli et al. 2005, Viaud-Martinez et al. 2008), is endemic in the Black Sea and possibly the Marmara Sea, whereas the species is circumglobal, widely distributed in temperate and tropical waters of all oceans, as well as in most semi-enclosed seas including different parts of the Mediterranean Sea (see p. 47).

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Possibly Vagrant	Other
Bulgaria	●						
Georgia	●						
Romania	●						
Russian Federation	●						
Spain						●	
Turkey	●						
Ukraine	●						

Distribution in the Mediterranean and Black Seas	The range of the subspecies includes the entire Black Sea, the Kerch Strait along with adjoining southern part of the Azov Sea and, probably (because so far there is no certain genetic evidence), the Turkish Straits System including the Marmara Sea, Bosphorus and Dardanelles straits. There are a few records of bottlenose dolphins entering major rivers such as the Danube and Dnieper (Birkun 2006). A possible vagrant from the Black Sea was identified genetically in the western Mediterranean (Natoli et al. 2005).

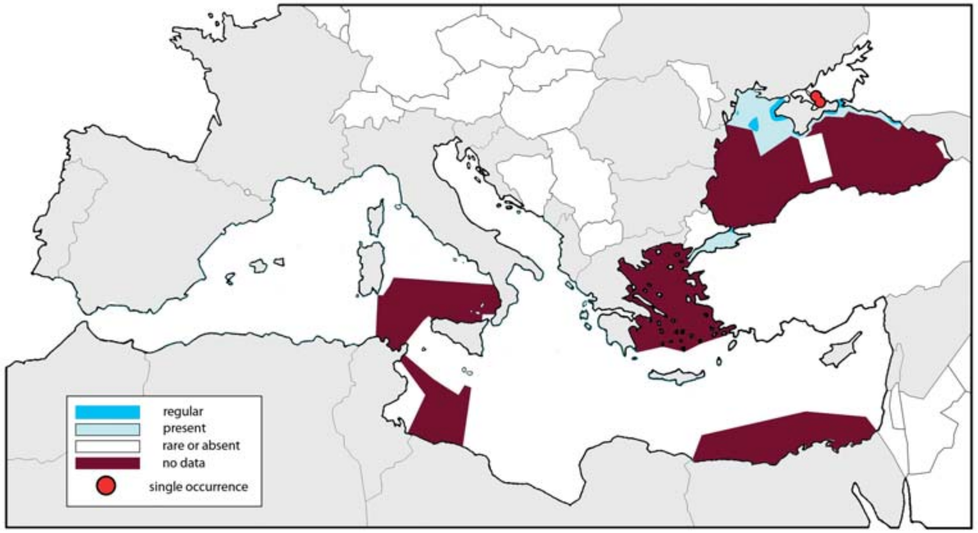


Fig. 18. Presumed distribution of *Tursiops truncatus ponticus* in the ACCOBAMS area. Red dots show two strandings of dead animals in the Azov Sea.

Habitat and ecology	Black Sea bottlenose dolphins inhabit shallow shelf area and occur also offshore in deeper waters (e.g., Mikhalev 2004a). They form scattered communities of some tens to ~150 animals in different locations around Crimea including the Kerch Strait and coastal waters off the western and southern extremities of the peninsula (Birkun et al. 2004, Birkun 2006). Concentrations are also known to occur off the Russian Caucasus and close to the Turkish coast (Birkun 2008a). At least 14 fish species, both demersal and pelagic, were reported as prey, including the introduced (alien) far-east mullet, *Liza haematocheila* (Krivokhizhin & Birkun 2009); this species possibly now constitutes a substantial part of the dolphin's diet, at least in the northern Black Sea.
Population data	The actual population size is unknown. In the 20th century, the number of Black Sea bottlenose dolphins was reduced by direct killing for the cetacean processing industry, which continued until 1983 (Birkun 2002a, International Whaling Commission 2004). Estimates of abundance from a series of line transect surveys in different parts of the range (Dede 1999 cited in International Whaling Commission 2004, Birkun et al. 2002, 2003, 2004, 2006, Komakhidze & Goradze 2005, Krivokhizhin et al. 2006) suggest that the present population size is at least several thousands but, presumably, not more than ~15,000 animals (Birkun 2008b).
Status	Since 2008, the Black Sea bottlenose dolphin is listed as **Endangered** (EN) A2cde in the IUCN Red List of Threatened Species. The ACCOBAMS conservation status of this subspecies is also EN (2007; Res. 3.19). Grounds for listing include (Birkun 2008b): a) large directed kills in the past (at least 24,000-28,000 in 1946-83); b) ongoing incidental mortality in bottom-set gillnets (in the order of hundreds/ year); c) live capture probably of up to 1000 individuals since the mid-1960s; d) a mortality event of unknown cause in 1990; and e) habitat degradation and decline in prey populations peaking in the late 1980s–early 1990s.

Fig. 19. Striped dolphins *(Stenella coeruleoalba)* in the Pelagos Sanctuary. Photograph by Federico Bendinoni/Tethys Research Institute.

Common name	Striped dolphin
scientific name	*Stenella coeruleoalba* (Meyen 1833)
Arabic	دلفين أزرق وأبيض (delfin azraq wa abyad)
Croatian	prugasti dupin
French	dauphin bleu et blanc
Greek	ζωνοδέλφινο (zonodélfino)
Hebrew	סטנלה מפוספסת (stenella mefuspeset)
Italian	stenella striata
Maltese	stenella
Portuguese	golfinho riscado
Spanish	delfín listado
Turkish	cizgili yunus
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Stenella***
world distribution	Temperate and subtropical waters of all oceans.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania	●					
Algeria	●					
Bosnia and Herzegovina				●		
Croatia			●			
Cyprus	●					
Egypt		●				
France	●					
Gibraltar (UK)	●					
Greece	●					
Israel	●					
Italy	●					
Lebanon		●				

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya	●					
Malta	●					
Monaco	●					
Montenegro	●					
Morocco	●					
Palestinian Territory		●				
Portugal	●					
Slovenia			●			
Spain	●					
Syria		●				
Tunisia	●					
Turkey	●		● (Marmara Sea)			

Distribution in the Mediterranean and Black Seas	
	The commonest oceanic cetacean in the Mediterranean, found in offshore waters from Gibraltar to the Aegean Sea and the Levant basin. Movements reportedly occur across the Gibraltar Strait, and the species is present in the Contiguous Atlantic Area. Particularly abundant in the Ligurian Sea, the Gulf of Lions, the waters between the Balearic Islands and the Iberian mainland, and the Alborán Sea. Also frequent in the Ionian Sea and open waters of the southern Adriatic Sea (Notarbartolo di Sciara et al. 1993, Boisseau et al. 2010). A small number of striped dolphins is confined within the eastern portion of the Gulf of Corinth (Greece), possibly isolated from the rest of the Mediterranean population (Frantzis & Herzing 2002, G. Bearzi pers. comm.). Striped dolphin abundance appears to be decreasing towards the eastern portion of the Mediterranean basin, probably reflecting a decreasing gradient of marine productivity. Two strandings were recorded in the Marmara Sea in 1990s (Öztürk et al. 1999). Absent from the Black Sea.

Habitat and ecology	
	Typically oceanic, inhabiting preferentially deep, highly productive waters off the continental shelf (Notarbartolo di Sciara et al. 1993, Forcada et al. 1994, Frantzis et al. 2003, Gannier 2005) where the species feeds on mesopelagic fish, cephalopods and planktonic crustaceans. In the Ligurian Sea striped dolphins appeared to be homogeneously distributed, without a particular preference for specific physiographic features (Azzellino et al. 2008).

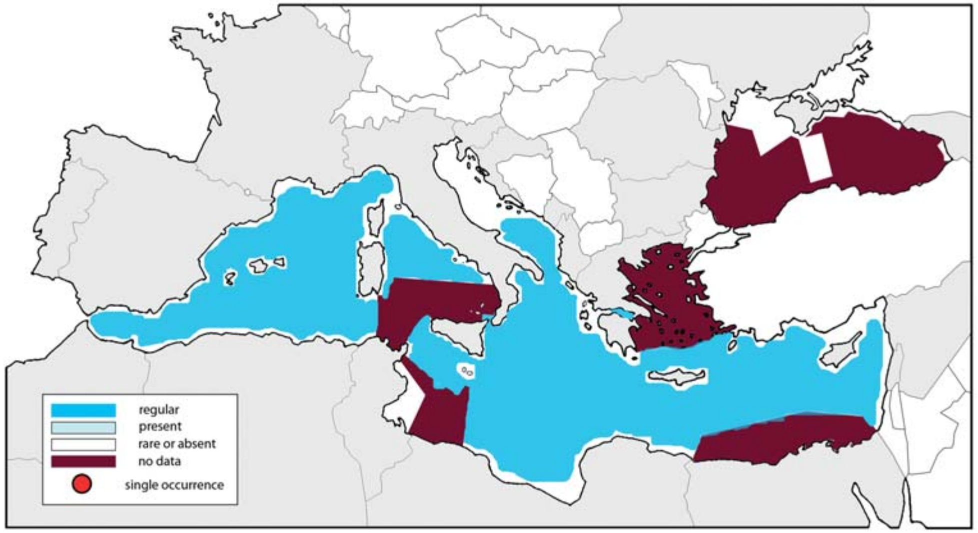


Fig. 20. Presumed distribution of *Stenella coeruleoalba* in the ACCOBAMS area.

Population data	Considered to be the most abundant cetacean in the Mediterranean, although no overall population estimate for the region exists. Line-transect surveys have been conducted over portions of the region: e.g., western Mediterranean excluding the Tyrrhenian Sea (1991): 117,880 (95%CI=68,379-214,800; Forcada et al. 1994); Balearic Sea (1991): 5,826 (95%CI=2,193-15,476; Forcada & Hammond 1998); Gulf of Lions (1991): 30,774 (95%CI=17,433-54,323; Forcada & Hammond 1998); Ligurian Sea (1992): 14,003 (95%CI=6,305-31,101; Forcada et al. 1995); south Balearic area (1991): 18,810 (95%CI=8,825-35,940; Forcada & Hammond 1998); Alborán Sea (1991): 17,728 (95%CI=9,507-33,059; Forcada & Hammond 1998); central coast of Spain (2000-2002): 15,778 (95%CI=10,940-22,756; Gómez de Segura et al. 2006). Recent (Summer 2010) aerial surveys conducted in previously unsurveyed areas (western Mediterranean west of Sardinia, central Tyrrhenian Sea, western Ionian Sea and Gulf of Taranto) detected high numbers of striped dolphins (S. Panigada & G. Lauriano, pers. comm.). Mediterranean striped dolphins are distinct from Atlantic conspecifics based on morphological (Calzada & Aguilar 1995, Archer 1997) and genetic (Garcia-Martinez et al. 1999, Gaspari et al. 2007b) characters, with little or no gene flow across the Straits of Gibraltar (Garcia-Martinez et al. 1999, Aguilar & Gaspari 2010). On a finer geographic scale, Gaspari et al. (2007) found evidence of genetic differentiation between inshore and offshore populations in the Ligurian Sea.
Status	Striped dolphins in the Mediterranean are subject to a wide range of threats (for a summary see Aguilar & Gaspari 2010), including: a) die-offs caused by morbillivirus epizootics (Bortolotto et al. 1992, Aguilar & Raga 1993, Aguilar & Borrell 1994, Domingo et al. 1995, Raga et al. 2008, Garibaldi et al. 2008); b) high levels of contaminants (organochlorines and heavy metals) in body tissues, known to be immunosuppressive (Marsili & Focardi 1997, Aguilar 2000, Aguilar & Borrell 2005); and c) massive by-catch in pelagic driftnets (Notarbartolo di Sciara 1990, Tudela et al. 2005). Other threats include prey depletion by overfishing (Pulcini et al. 1992, Blanco et al. 1995), and, in prespective, possible habitat disruption by global climate change (Gambaiani et al. 2009). Based on the number of cumulative threats it is subject to, which have purportedly reduced its abundance and impaired its recovery, the Mediterranean population of striped dolphins was proposed as **Vulnerable,** VU A2bde by Aguilar & Gaspari (2010).

Fig. 21. One of the few remaining short-beaked common dolphins *(Delphinus delphis)* leaps in the Greek internal waters of the western Ionian Sea.
Photograph by Stefano Agazzi/Tethys Research Institute.

Common name	Short-beaked common dolphin
scientific name	*Delphinus delphis* Linnaeus 1758
Albanian	delfin i zakonshem
Arabic	دلفين شائع (delfin chaii)
Croatian	obični dupin, mali dupin
French	dauphin commun
Greek	κοινό δελφίνι (koinò délfini)
Hebrew	דולפין מובהק או דולפין מצוי (dolphin muvhaq, dolphin matzui)
Italian	delfino comune
Maltese	delfin komuni
Portuguese	golfinho comum
Spanish	delfín común
Turkish	tirtak
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Delphinus***
world distribution	Widely distributed in cool temperate to tropical waters of the Atlantic, Pacific, and probably Indian oceans.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania		●				
Algeria	●					
Bosnia and Herzegovina		●				
Croatia	●					
Cyprus	●					
Egypt	●					
France	●					
Gibraltar (UK)	●					
Greece	●					
Israel	●					
Italy	●					
Lebanon		●				

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Libya		●				
Malta	●					
Monaco	●					
Montenegro		●				
Morocco	●					
Palestinian Territory	●					
Portugal	●					
Slovenia		●				
Spain	●					
Syria		●				
Tunisia	●					
Turkey	●					

Distribution in the Mediterranean and Black Seas

Once one of the commonest species in the Mediterranean Sea, the population has experienced a dramatic decline in this region during the last 40-50 years, and has almost completely disappeared from large portions of its former range (Bearzi 2003, Bearzi et al. 2003). Today, common dolphins remain relatively abundant only in the Alborán Sea. There are sparse records off the coast of Algeria, around Sardinia and Corsica, in the south-eastern Tyrrhenian Sea off the island of Ischia, in the Strait of Sicily and around Malta, in portions of the eastern Ionian Sea and in the Gulf of Corinth, in the Aegean Sea, and off southern Israel. Otherwise, common dolphins are rare or absent from areas where information is available such as the Adriatic Sea, the Balearic Sea, the Provencal basin and the Ligurian Sea (Bearzi et al. 2003).

A different subspecies, *D. d. ponticus,* is found in the Black Sea (see p. 63).

Habitat and ecology

Found both in the oceanic and in the neritic environment, often sharing the former with striped dolphins and the latter with common bottlenose dolphins. Observations in the eastern Ionian Sea are indicative of high levels of site fidelity. Typically found in groups of 50-70 animals, with larger aggregations occasionally recorded. In the eastern Ionian Sea, however, groups are rarely >15, and groups >40 have never been observed (Bearzi et al. 2003). Feeds mostly on small epipelagic schooling fishes (Agazzi et al. 2004).

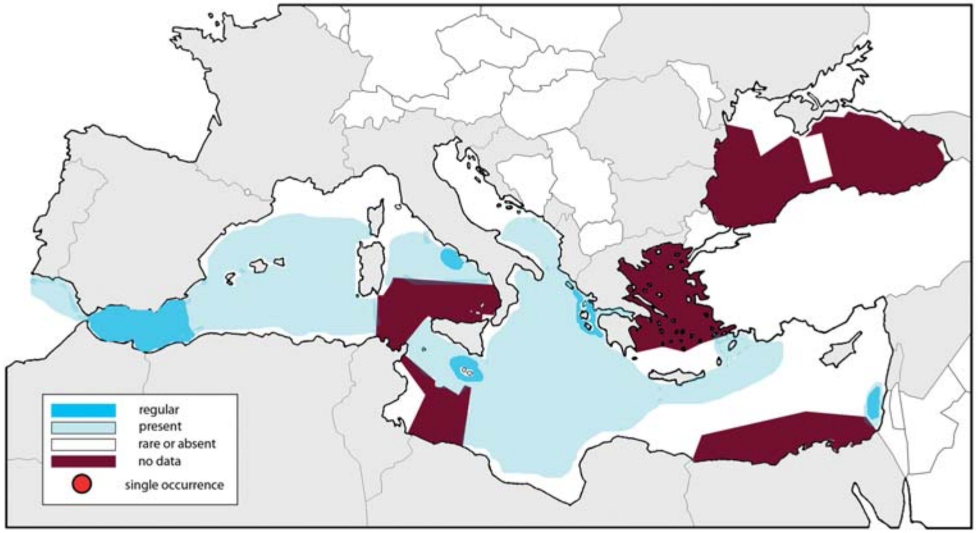


Fig. 22. Presumed distribution of *Delphinus delphis* in the ACCOBAMS area.

Population data	There is no overall population estimate for common dolphins anywhere in the Agreement area. Line-transect ship surveys of the Alborán Sea in 1991-92 produced an estimate of 14,736 (CV=0.38; 95% CI=6,923-31,366), with a density of 0.16 dolphins per km^2, but no estimates were made for this species elsewhere in the western Mediterranean due to the low number of sightings (Forcada & Hammond 1998). Vella (2002) combined data from ship and aerial surveys conducted between 1997-2002, and obtained a density estimate of 0.135 dolphins per km^2 (CV=0.28; 95% CI=0.066-0.290) in the area around the Maltese islands. Around the island of Kalamos in the eastern Ionian Sea, the mean sighting frequency was 0.016 groups/km surveyed (or 0.11 dolphins/km) in the years 1993-2000, but in 2001-2002 there was a significant decrease to 0.007 groups/km (or 0.04 dolphins/km) (Student's t=4.88, p<0.001). The number of individuals encountered in this area has decreased continually, and many individuals that used to be seen regularly until 1996 have since disappeared (Bearzi et al. 2003). Genetic exchange between common dolphins from the Mediterranean Sea and Atlantic Ocean, to the extent that it occurs, appears to involve only animals from the Alborán Sea (Natoli et al. 2008), possibly limited eastward by oceanographic features such as the Almería-Orán thermohaline front. At the eastern end of the Mediterranean, based preliminary on results obtained by A. Natoli (2004), the gene flow between Mediterranean and Black Sea common dolphins appears to be rare to non-existent.
Status	A number of impacting factors may have contributed, singly or in synergy, to the decline of common dolphins in the Mediterranean (Bearzi et al. 2003, Bearzi 2003, Bearzi et al. 2008b). In all areas where common dolphins have been studied consistently (i.e., the Alborán Sea, the south-eastern Tyrrhenian Sea) competition with fisheries is a source of concern, and in the case of the eastern Ionian Sea was a proven cause of decline (Bearzi et al. 2008b). The role of xenobiotic contamination is controversial but likely significant (Fossi et al. 2000, Aguilar et al. 2002). Large numbers of common dolphins are bycaught yearly in the Moroccan driftnet fishery in the Alborán Sea (Tudela et al. 2005), and it is reasonable to assume that the same applies in other parts of the Mediterranean where driftnet fishing and common dolphin occurrence overlap (Bearzi 2003). The cumulative importance of these threats and other factors is poorly understood. On the basis of the observed decline, the Mediterranean population of short-beaked common dolphins was assessed as **Endangered** (EN A2abc) (Bearzi 2003).

Fig. 23. A Black Sea common dolphin *(Delphinus delphis ponticus)* fast swimming in the Black Sea. Photograph by Sergey Krivokhizhin/Brema Laboratory.

Common name	Short-beaked common dolphin, Black Sea subspecies (Black Sea common dolphin)
scientific name	*Delphinus delphis ponticus* Barabash-Nikiforov 1935
Bulgarian	obiknoven delfin, karakash
Georgian	thethrgverda delfini, chveulebrivi delfini
Romanian	delfin comun
Russian	черноморский дельфин-белобочка, белобочка, обыкновенный дельфин (chernomorskiy del'fin -belobochka, belobochka, obyknovennyi del'fin)
Turkish	tirtak
Ukrainian	чорноморський дельфін-білобочка, білобочка, звичайний дельфін (chornomors'kyi del'fin -bilobochka, bilobochka, zvychainyi del'fin)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Delphinus*** Species: ***Delphinus delphis***
world distribution	The Black Sea common dolphin was proposed as an endemic subspecies on the basis of morphological features that were later criticized as not being diagnostic. However, more recent comparative analyses using skull morphometrics (Amaha 1994) and nine microsatellite DNA loci (Natoli 2004) suggested that differences do exist between Black Sea and Mediterranean common dolphins. Recognition of the subspecies was also recommended by Perrin et al. (2010).

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Possibly Vagrant	Other
Bulgaria	●						
Georgia	●						
Romania	●						
Russian Federation	●						
Turkey	●						
Ukraine	●						

Distribution in the Mediterranean and Black Seas	
	The range of the Black Sea common dolphin population is represented by almost the entire Black Sea. Common dolphins are well known also in the Turkish Straits System (including the Bosphorus, Marmara Sea and Dardanelles) but their possible belonging to the Black Sea subspecies should be verified by respective taxonomic studies including genetic analysis. Common dolphins do not occur in the Azov Sea and normally avoid the Kerch Strait, although two single live stranding were recorded there in 1994 at the time of a morbillivirus epizootic (Birkun et al. 1999) and in 2009 (unpublished data).

Fig. 24. Presumed distribution of *Delphinus delphis ponticus* in the ACCOBAMS area. The red dot marks the location of two known live strandings in the Kerch Strait.

Habitat and ecology	Common dolphins are distributed mainly offshore and visit coastal waters following seasonal aggregations of their preferred prey, small pelagic fishes such as the Black Sea anchovy (*Engraulis encrasicolus ponticus*) and the Black Sea sprat (*Sprattus sprattus phalaericus*) (e.g., Bushuyev & Savusin 2004, Mikhalev et al. 2004). Annual winter concentrations of anchovies in the southeastern Black Sea and, to a lesser degree, south of Crimea create favourable conditions for wintering concentrations of common dolphins. Summer concentrations of sprats in the northwestern, northeastern and central Black Sea attract common dolphins to quite different feeding grounds. A list of prey consumed by *D. d. ponticus* contains 11 fish species (Krivokhizhin & Birkun 2009). These cetaceans avoid waters with low salinity, and this may explain why they never occur in the Azov Sea and, normally, in the Kerch Strait.
Population data	The population size is unknown. In the 20th century the population was much reduced or even depleted due to long-running overexploitation (directed kills), which continued until 1983 (Birkun 2002a, International Whaling Commission 2004). Line transect surveys were conducted during a ten-year period (1997-2006) to estimate the species' abundance in a few parts of the range including: a) the Turkish Straits System (Dede 1999 cited in International Whaling Commission 2004); b) the northern, northwestern and northeastern Black Sea within boundaries of the Russian and Ukrainian territorial waters (Birkun et al. 2004); c) the southeastern Black Sea within the Georgian territorial waters (Birkun et al. 2006); and d) the central Black Sea between the territorial waters of Ukraine and Turkey (Krivokhizhin et al. 2006). The results suggest that the current population size can be at least several 10,000s, and possibly 100,000 or more (Birkun 2008c).
Status	The ACCOBAMS conservation status of the Black Sea common dolphin is **Endangered** EN (2007; Res. 3.19), whereas the IUCN Red List status fits with category **Vulnerable** VU A2cde (2008-10). Grounds for justification include (Birkun 2008c): a) large directed kills in the past (at least 159,000-161,000 in 1962-83); b) mortality event of unknown cause in 1990 (at least 100s of dolphins); c) mortality event caused by morbillivirus in 1994 (at least 100s of dolphins again); and d) habitat degradation and decline in prey populations peaking in the late 1980s–early 1990s.

Fig. 25. A harbour porpoise photographed in the North Atlantic Ocean. Photograph by Preben Toft.

Common name	Harbour porpoise, North Atlantic subspecies
scientific name	*Phocoena phocoena phocoena* (Linnaeus 1758)
Arabic	الشاىع البحر خنزير (khinzir albahr achaii)
Croatian	obalni dupin
French	marsouin
Greek	φώκαινα (fókaina)
Hebrew	פוקנה (pokena)
Italian	focena comune
Maltese	denfil iswed
Portuguese	bôto
Spanish	marsopa común
Turkish	mutur
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Phocoenidae** Genus: ***Phocoena*** species: ***Phocoena phocoena***
world distribution	Harbour porpoises are found in cold temperate to sub-polar waters of the Northern Hemisphere. They are usually found in continental shelf waters, although they occasionally travel over deeper offshore waters (Hammond et al. 2008).

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania						
Algeria						
Bosnia and Herzegovina						
Croatia						
Cyprus						
Egypt						
France						
Gibraltar (UK)						
Greece						
Israel						
Italy					●	
Lebanon						
Libya						
Malta						
Monaco						
Montenegro						
Morocco	● (Contiguous Atlantic)			● (Mediterranean)		
Palestinian Territory						
Portugal	●					
Slovenia						
Spain	● (Contiguous Atlantic)		● (Mediterranean)			
Syria						
Tunisia						
Turkey						

Distribution in the Mediterranean and Black Seas	Regular, albeit rare, in the Contiguous Atlantic, individuals are known to occasionally stray into the Mediterranean (see Table 9). The past regular presence of *P. phocoena* in the Mediterranean is a subject of controversy (for a review see Frantzis et al. 2001). Most of the available evidence points to the absence of the species from the Mediterranean in historical times, although one museum specimen exists which was reportedly captured in the Adriatic Sea (Table 9).

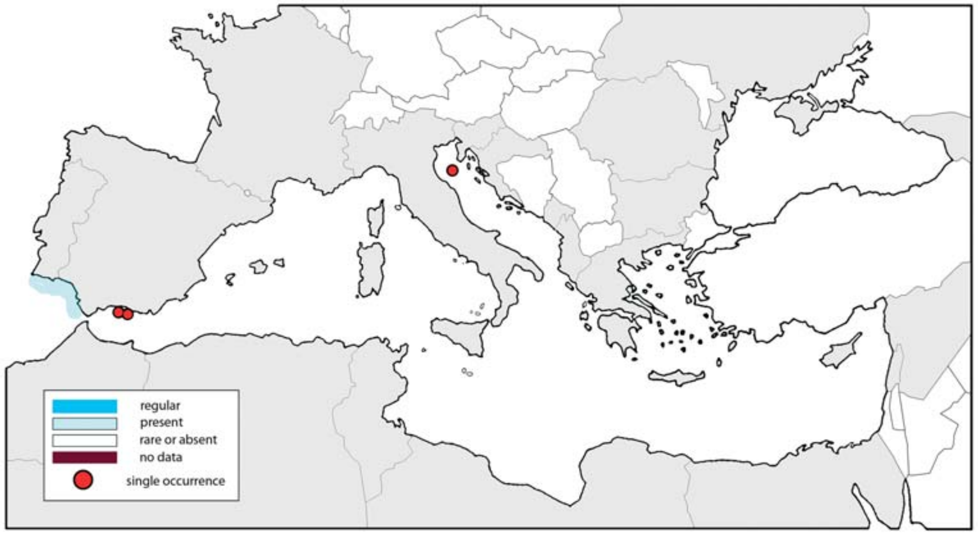


Fig. 26. Presumed distribution of *Phocoena phocoena phocoena* in the ACCOBAMS area.

Habitat and ecology	This is a predominantly neritic cetacean, frequenting coastal areas, shallow bays, inlets and estuaries. Feeds on a variety of fish and cephalopod species, both demersal and pelagic.
Population data	Harbour porpoises found in the Contiguous Atlantic belong to a North Atlantic population unit recognised as inhabiting the Iberian Shelf. A surface survey conducted in the area in July 2005 estimated a central value of 2,900 porpoises over the Iberian Shelf, from the Bay of Biscay to the Gulf of Cadiz (Hammond & MacLeod 2006). No viable populations of *P. p. phocoena* are known to live in the Mediterranean.
Status	The status of the whole subspecies was determined as **Least Concern** (Hammond et al. 2008). The status of the population frequenting the Contiguous Atlantic has not been assessed.

Date	Location	Sex	Size	Notes	Reference
1822	Adriatic Sea			Cranium in the Museum of comparative anatomy of the University of Bologna, from a specimen reportedly caught in the Adriatic Sea. Tentatively attributed to *P. p. phocoena*, pending genetic analyses.	Cagnolaro (1996), citing Alessandrini (1852) concerning the origin of the specimen
1981 (Oct)	Playa de Malagueta, Spain	F		Stranded	Frantzis et al. 2001 citing Rey & Cendrero 1982
2006 (6 Jul)	Malaga, Spain	M	1.65 m	Stranded alive	Ana Cañadas, pers comm.

Table 9. Known occurrences of *Phocoena phocoena phocoena* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006).
Note: reports from the Mediterranean of harbour porpoises considered doubtful in the review by Frantzis et al. (2001) are not listed in the table above, nor marked in the map.

Fig. 27. A Black Sea harbour porpoise *(Phocoena phocoena relicta)* caught in a bottom-set gillnet. Photograph by Sergey Krivokhizhin/Brema Laboratory.

Common name	Harbour porpoise, Black Sea subspecies (Black Sea harbour porpoise)
scientific name	*Phocoena phocoena relicta* Abel 1905
Bulgarian	morska svinya, mutkur
Georgian	zghvis ghori, mutkhuri
Greek	φώκαινα (fókaina)
Romanian	marsuin, focenă porc de mare
Russian	черноморская обыкновенная морская свинья, азовка (chernomorskaya obyknovennaya morskaya svinya, azovka)
Turkish	mutur
Ukrainian	чорноморська звичайна морська свиня, азовка, пихтун (chornomors'ka zvychaina mors'ka svynya, azovka, pykhtun)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Phocoenidae** Genus: ***Phocoena*** Species: ***Phocoena phocoena***
world distribution	*P. p. relicta*, confirmed by genetic and morphometric studies (Rosel et al. 1995, 2003, Fontaine et al. 2007, 2010, Viaud-Martinez et al. 2007), is endemic in the Black Sea and neighbouring waters. Its population is separated from the nearest conspecifics (*P. p. phocoena*) in the north-eastern Atlantic by a broad range discontinuity in the Mediterranean Sea, from the northern Aegean Sea to the Strait of Gibraltar (Frantzis et al. 2001).

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Possibly Vagrant	Other
Bulgaria	●						
Georgia	●						
Greece	●						
Romania	●						
Russian Federation	●						
Turkey	●						
Ukraine	●						

Distribution in the Mediterranean and Black Seas	The subspecies' range encompasses the Black Sea proper and adjacent water bodies such as the Azov Sea, Kerch Strait, Turkish Straits System (Bosphorus, Marmara Sea, Dardanelles), and northern Aegean Sea. The occurrence in the Dardanelles Straits and Turkish Aegean Sea (Saroz Bay) was confirmed recently by findings of two stranded harbour porpoises there (Tonay et al. 2009). Sporadic strandings (including live strandings) and sightings (including group sightings) of porpoises in the Greek northern Aegean are known since 1993 (at least nine records were reported before 2008 for the Thracian Sea, Kavala Gulf, Strymonikos Gulf, Agiou Orous Gulf, and Thermaikos Gulf) (Frantzis et al. 2001, 2003, Rosel et al. 2003, Birkun and Frantzis 2008). Black Sea and Aegean porpoises have identical mtDNA sequences in the hypervariable control region (Rosel et al. 2003) but it is possible that they represent separate subpopulations of the subspecies. Occasionally, harbour porpoises have been sighted in the Danube, Dnieper, Don and Kuban rivers, their estuaries, deltas and tributaries (e.g., in the Danube in 1984-89 and 2003 or in the Ingulets, a confluent of the Dnieper, in 1999), and coastal freshwater, brackish and saline lakes and lagoons including the Yalpug and Sivash lakes, Berezansky and Grigorievsky lagoons, Tendrovsky, Yagorlytsky and Jarylgachsky bays, and the Gulf of Taganrog (Birkun 2006, 2008a). All of these sites are situated on the northern and northwestern coasts of the Black Sea and round the Azov Sea.

Habitat and ecology	Harbour porpoises inhabit mainly shallow waters over the continental shelf around the entire perimeter of the Black Sea. Sometimes they also occur far offshore in deep water (Mikhalev 2004b; Krivokhizhin et al. 2006). During the warm season they venture into the Azov Sea through Kerch Strait (e.g., Kleinenberg 1956), as well as in the Marmara Sea and Bosphorus (Öztürk and Öztürk 1997). Both of these small seas (as well as the northwestern Black Sea shelf zone) may represent geographically disjunct breeding-calving-feeding areas while the straits (Kerch and Bosphorus) serve as migration corridors. Harbour porpoises undertake annual migrations, leaving the Azov Sea (e.g., Tzalkin 1938) and northwestern Black Sea (Birkun 2006) before winter and returning in spring. Such movements also may occur between the Black Sea and Marmara Sea. In the latter (along with the Bosphorus) there were no records for January-March (Öztürk and Öztürk 1997); during the period from March 2007 to June 2008, most sightings in the Bosphorus were recorded in spring and summer (Öztürk et al. 2009). The primary wintering areas are situated in the south-eastern Black Sea (Birkun et al. 2006) including the southern Georgian territorial waters and perhaps the eastern Turkish territorial waters. Most of the Black Sea porpoise population may congregate there every year. These are also the well-known wintering grounds of Black Sea and Azov Sea populations of the anchovy *(Engraulis encrasicolus ponticus and E. e. maeoticus),* an important prey species for harbour porpoises during the cold season (Kleinenberg 1956). At least 20 fish species have been recorded in the species' stomachs, of which three are considered as the most important prey: anchovy, sprat *(Sprattus sprattus phalaericus)* and whiting *(Merlangius merlangus euxinus)* (Krivokhizhin and Birkun 2009). Black Sea harbour porpoises also occur in waters with low salinity and high turbidity; during the warm season they may visit brackish bays, lagoons, estuaries and rivers.

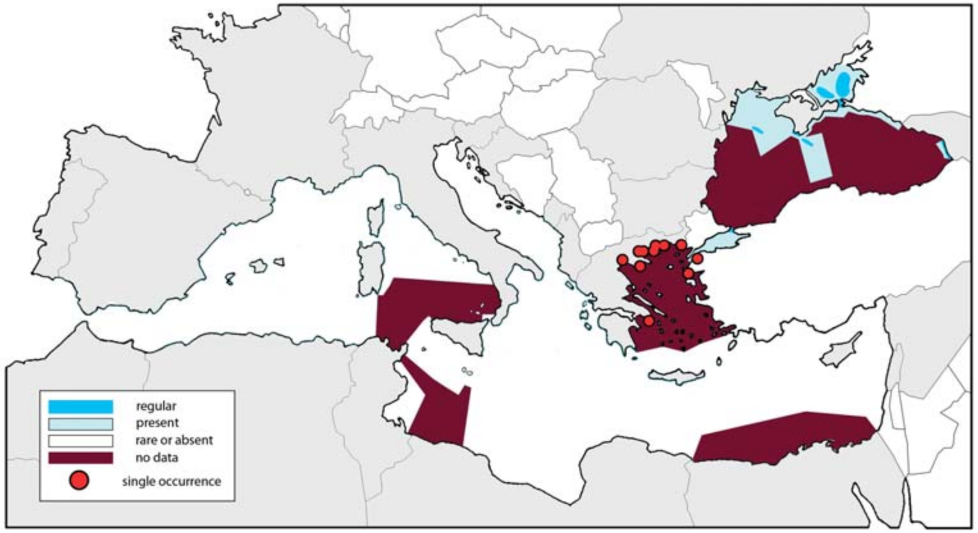


Fig. 28. Presumed distribution of *Phocoena phocoena relicta* in the ACCOBAMS area, and known occurrences (sightings and strandings including live strandings) in the Aegean Sea.

Population data	There are no current estimates of total population size. In the 20th century, the number of Black Sea harbour porpoises was dramatically reduced by massive direct killing for the cetacean-processing industry that continued until 1983 (Birkun 2002a, International Whaling Commission 2004). Line transect surveys were conducted during the last decade to estimate harbour porpoise abundance in different parts of the range. In particular, aerial surveys were conducted in the Azov Sea, Kerch Strait (Birkun et al. 2002, 2003) and northeastern shelf area of the Black Sea (Birkun et al. 2003); vessel-based surveys were performed in the Kerch Strait, territorial waters of Ukraine and Russia in the Black Sea (Birkun et al. 2004), Georgian territorial sea (Birkun et al. 2006), and the central part of the Black Sea between Ukraine and Turkey (Krivokhizhin et al. 2006). Survey results suggest that the present total population size is at least several 1,000s and possibly in the low 10,000s (Birkun and Frantzis 2008).
Status	The Black Sea harbour porpoise has been assessed as **Endangered** (EN) in Resolution 3.19 of ACCOBAMS MoP3 (2007) and as EN A1d+4cde in the IUCN Red List of Threatened Species (2008-10). Grounds for justification (Birkun and Frantzis 2008) include: a) large directed kills in the past (at least 163,000-211,000 in 1976-83); b) ongoing incidental mortality in bottom-set gillnets (some 1000s per year); c) a mass mortality event in 1982 in the Azov Sea due to an explosion at a gas-extraction platform (>2,000 porpoises were found dead); d) two mortality events in 1989 and 1990 caused by the combined effects of parasitic and bacterial infections (several thousand individuals); e) a mortality event in 1993 caused by the ice entrapment of porpoises in the Azov Sea (at least several tens of porpoises); f) habitat degradation and decline in prey populations peaking in the late 1980s–early 1990s.

• 5.2. Visitor species

Fig. 29. A dead juvenile common minke whale, *Balaenoptera acutorostrata,* bycaught in Israel in May 2000, awaits necropsy. Photograph by IMMRAC.

Common name	Common minke whale
scientific name	*Balaenoptera acutorostrata* Lacépède 1804
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Mysticeti** Family: **Balaenopteridae** Genus: ***Balaenoptera***
world distribution	A cosmopolitan species, present at all latitudes in both hemispheres. Most frequent in cold temperate, sub-polar and polar waters.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania						
Algeria						
Bosnia and Herzegovina						
Croatia						
Cyprus						
Egypt						
France			●			
Gibraltar (UK)						
Greece			●			
Israel			●			
Italy			●			
Lebanon						
Libya						
Malta						
Monaco						
Montenegro						
Morocco	● (Atlantic)		● (Mediterranean)			
Palestinian Territory						
Portugal		●				
Slovenia						
Spain		● (Atlantic)	● (Mediterranean)			
Syria						
Tunisia			●			
Turkey (Mediterranean)						

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Bulgaria						
Georgia					●	
Romania						
Russian Federation						
Turkey (Black Sea)						
Ukraine						

Occurrences in the Mediterranean and Black Seas

North Atlantic individuals occasionally enter the Mediterranean through the Strait of Gibraltar from the Contiguous Atlantic Area, where the species is considered Visitor. A total of 29 sighting and stranding events are described in Table 10.

There is one ancient (1880) record of a minke whale stranding on the coast of Georgia, in the Black Sea (Tomilin 1967), where the species can be considered Vagrant (Table 10).

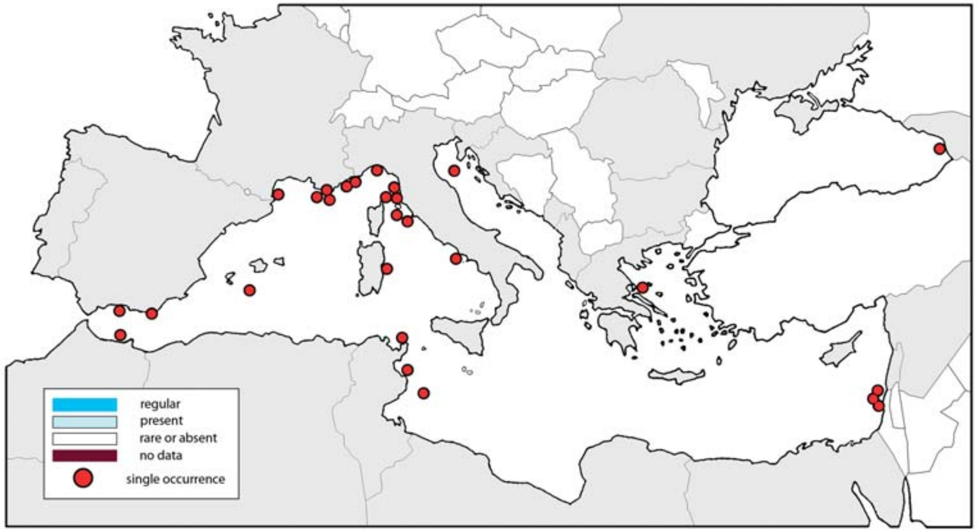


Fig. 30. Known occurrences of *Balaenoptera acutorostrata* in the ACCOBAMS area (details in Table 10).

Habitat and ecology

Found both in neritic and oceanic habitats, most frequently over the continental shelf.

Population data

No viable populations are known to live in the Mediterranean and Black Seas.

Date	Location	Sex	Size	Notes	Reference
1771	Adriatic Sea (likely location)		Possibly <4 m	Juvenile, acquired from the fish market in Bologna	Capellini 1877
1840 (Oct)	Clollioure, Pyrénées Orientales, France		5.4 m	Stranded. Skeleton conserved in the Nat. Hist. Museum of Perpignan	Companyo 1841
1878 (18 Feb)	Villefranche-sur-Mer, France		3.0 m	Captured	Giglioli 1880
1880 (18 Apr)	Batumi, Georgia		possibly 9 m	Stranded	Tomilin 1967
1898 (Jun)	Gulf of Baratti, Livorno, Italy	F	5.5 m		Parona 1908
1899 (6 Oct)	Porto S. Stefano, Grosseto, Italy		4.75 m	By-caught	Carruccio, 1899, 1900
1911 (14 Nov)	Marciana Marina, Elba Island, Italy		7-8 m	Found dead	Damiani 1911
1916 (26 Apr)	Camogli, Italy			Juvenile (cranium and mounted skin) in Genoa Museum, possibly by-caught	Arbocco 1969
1925 (11 May)	Lacco Ameno, Ischia, Italy		6 m	By-caught in fixed tuna trap	Monticelli 1926
1975 (May)	Mahdia, Tunisia			head only (40 cm long)	Ktari-Chakroun 1980
1976 (May)	Sidi Daoud, Tunisia		4.7 m	By-caught in fixed tuna trap	Ktari-Chakroun 1980
1977 (9 Jun)	Bandol, France	F	3.75 m	Captured	Van Waerebeek et al. 1999
1978-1981	Italian seas (unspecified)			2 different records of bycatch in driftnets, involving 4 specimens	Di Natale & Mangano 1981
1978-1981	Italian coasts (unspecified)			One specimen stranded	Di Natale & Mangano 1981
1982 (20 Apr)	St. Raphael, France	F	3.60 m	Found stillborn, umbilical cord and placenta still attached	Bompar 2000
1991 (11 Mar)	Lampedusa, Italy			Sighted off cliff, film available	Notarbartolo di Sciara & Demma, 1997
1991 (17 May)	Turas, east coast of Sardinia (Italy)		3.5 m	Stranded	Centro Studi Cetacei 1994
1993 (16 May)	Viareggio, Italy	M	7.65	Stranded alive	Centro Studi Cetacei 1996
1996 (Oct)	Beach of Casares, Malaga, Spain		4.5 m	Stranded	Van Waerebeek et al. 1999
1997 (31 Jul)	Varazze, Savona, Italy	F	4.35 m	Stranded	Centro Studi Cetacei 1998
1997 (11 Aug)	Porquerolles, France			Sighting (specific characters clearly described)	Van Waerebeek et al. 1999
1998 (12 Apr)	Antignano, Livorno, Italy		3.4 m	Stranded	Centro Studi Cetacei 2000
1998 (24 Apr)	Near Giens peninsula, France	M	3.40 m	Stranded after having been caught in a net	Van Waerebeek et al. 1999, Robineau 2005
1998 (May)	Toulon region, France	M	3.65 m	By-caught (apparently a different individual from the previous one)	Macé et al. 1999
2000 (8 May)	Akko, Israel			Calf found entangled in a gillnet	Scheinin et al. 2004
2000 (23 May)	Skiathos Island, Greece	M	4.16 m	Found dead	Verriopoulou et al. 2001
2002-2003	Near Al-Hoceima, Morocco			Adult by-caught in pelagic driftnet	Tudela et al. 2003
2003 (Aug)	Western Mediterranean		5 m	By-caught in Denmark, fitted with satellite tag and released on 5 June, travelled widely into the Atlantic and entered the Mediterranean	Teilmann et al. 2004
2004 (8 Feb)	Haifa, Israel	F	5 m	Calf found entangled in a net	Sheinin et al. 2004
2006 (2 Feb)	Kishon Port, Haifa, Israel		8 m	Sighted for several minutes at mouth of port	Goffman et al. 2006
2006 (18 Jul)	Bay of Almeria, Spain			Adult specimen sighted, documentation available	Ana Cañadas, pers. comm.

Table 10. Known occurrences of *Balaenoptera acutorostrata* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006, with subsequent additions). Note: Some references in the literature to minke whales in the region are not included in the table. These include: (a) unverifiable cases of "big whales", possibly minke whales, observed in the Black Sea near the Georgian coasts between 1880 and 1926 (Kleinenberg 1956 in Van Waerebeek et al. 1999); (b) the stranding on 17 Aug. 1839 of a "balenòptero picudo" in Barcelona, reported by Yàñez in 1842 (Casinos and Vericad 1976), considered unverifiable by those authors; (c) a specimen 5.5-6 m long stranded near Castel Fusano, Ostia (Italy), on 15 Dec. 1911, reported by Carruccio (1913) as a minke whale, but later identified as a young fin whale (Lepri 1914); (d) undocumented sighting reports from the Ligurian and Tyrrhenian seas (e.g., Di Natale 1983, Giordano 1988), and from the western Mediterranean (Beaubrun 1995).

Fig. 31. A humpback whale, *Megaptera novaeangliae,* hugs the Slovenian coast, northern Adriatic Sea, in winter 2009. Photograph by Tilen Genov/Morigenos.

Common name	Humpback whale
scientific name	*Megaptera novaeangliae* (Borowski 1781)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Mysticeti** Family: **Balaenopteridae** Genus: ***Megaptera***
world distribution	A widely distributed, far-ranging migrant mysticete, found with distinct populations in both hemispheres in all oceans.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania						
Algeria						
Bosnia and Herzegovina						
Croatia						
Cyprus						
Egypt						
France			●			
Gibraltar (UK)						
Greece			●			
Israel						
Italy			●			
Lebanon						
Libya						
Malta						
Monaco						
Montenegro						
Morocco		● (Atlantic)				
Palestinian Territory						
Portugal		●		●		
Slovenia			●			
Spain		● (Atlantic)	●			
Syria						
Tunisia			●			
Turkey (Mediterranean)						

Occurrences in the Mediterranean and Black Seas	Individuals from North Atlantic populations occasionally enter the Mediterranean, where the species is considered Visitor. A total of 17 sighting and stranding events are described in Table 11. No occurrences in the Marmara or Black Seas.

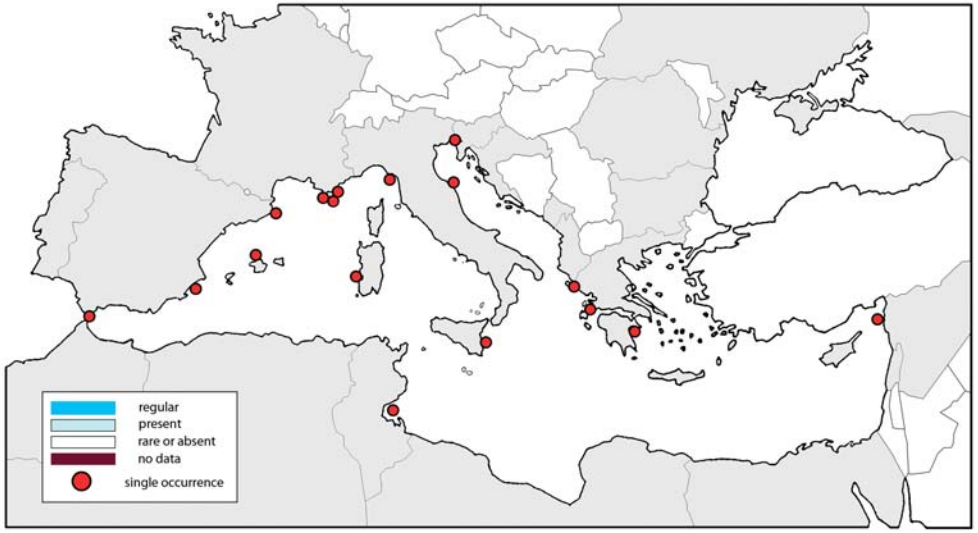


Fig. 32. Known occurrences of *Megaptera novaeangliae* in the ACCOBAMS area (details in Table 11).

Habitat and ecology	A highly migratory species, known to undertake extensive voyages between high-latitude feeding grounds (summer) and tropical breeding grounds (winter). Both feeding and breeding occur in shallow neritic zones, while migration routes bring these whales across deep oceanic waters.
Population data	No viable populations are known to live in the Mediterranean and Black Seas.

Date	Location	Sex	Size	Notes	Reference
1885 (Nov)	Toulon (France)		6.8 m	By-caught	Aguilar 1989
1986 (14 Mar)	Majorca, Spain			Sighting of 2, possibly female with calf	Aguilar 1989
1990 (Mar)	Bay of Aiguablava, Catalonia			Sighting of 1, possibly an adult	Pers. comm. from A. Aguilar in Frantzis et al. 2004
1992 (2 Oct)	Gulf of Gabés, Tunisia		8 m	By-caught	Chakroun 1994
1993 (21 May)	Cavalaire, France	F	7 m	By-caught	Bompar 2000
1993 (Aug)	Toulon, France			Sighting of 2	Pers. comm. from R. Sears in Frantzis et al. 2004
1998 (24 Jan)	Gulf of Oristano, Sardinia, Italy		7-8 m	Sighting	Frantzis et al. 2004
2001 (17 Apr)	Bay of Tolo, Myrtoon Sea, Greece		8-11 m	Repeated sighting of the same individual	Frantzis et al. 2004
2002 (19 Jul)	Lefkada Island, Greece			Sighting	Frantzis et al. 2004
2002 (4 Aug)	Senigallia, Italy			Sighting	Affronte et al. 2003
2003 (5 Apr)	Tartous, Syria	M	7.85 m	Stranded dead	Saad 2004
2004 (17 Feb)	Corfu Island, Greece	F	7.2 m	By-caught	Frantzis et al. 2004
2004 (2 Apr)	Siracusa, Italy		about 10 m	By-caught alive and released	Centro Studi Cetacei 2006
2009 (Feb–Apr)	Northern Adriatic Sea, Slovenia, Italy		about 10-12 m	Repeated sighting of the same individual	Genov et al. 2009
2010 (8 Aug)	Bay of Algeciras, Spain		8 m	Sighting	CIRCE website
2010 (26-28 Aug)	Eastern Ligurian Sea: off Versilia and Sestri Levante, Italy		about 10-13 m	Repeated sighting of the same individual; abundant photo and video documentation	local media
2010 (14 Sep)	between Cape San Antonio and Cape San Martín, Alicante (Spain)			Sighting of 2	Roque Belenguer, pers. comm.

Table 11. Known occurrences of *Megaptera novaeangliae* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006, with subsequent additions).

Fig. 33. A pod of false killer whales *(Pseudorca crassidens)* sighted off the coast of Israel. Photograph by Dr. Aviad Scheinin, IMMRAC, University of Haifa.

Common name	False killer whale
scientific name	*Pseudorca crassidens* (Owen 1846)
Arabic	مزيفة أُركة (arqa mouzaïfa)
Croatian	crni dupin
French	faux-orque
Greek	ψευδόρκα(psevdórka)
Hebrew	קטלני עבשן (av-shen katlan)
Italian	pseudorca
Portuguese	falsa orca
Spanish	falsa orca
Turkish	yalanci katil balina
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Pseudorca***
world distribution	Widely distributed in warm temperate and tropical waters globally, most often in deeper, offshore waters of all oceans.

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Albania						
Algeria						
Bosnia and Herzegovina						
Croatia			●			
Cyprus			●			
Egypt			●			
France			●			
Gibraltar (UK)			●			
Greece			●			
Israel			●			
Italy			●			
Lebanon						
Libya						
Malta						
Monaco						
Montenegro						

Territorial waters of:	Native – presence confirmed	Native – possibly present	Visitor	Possibly Visitor	Vagrant	Other
Morocco	● (Atlantic)					
Palestinian Territory						
Portugal		●				
Slovenia						
Spain		● (Atlantic)	●			
Syria			●			
Tunisia						
Turkey			●			

Occurrences in the Mediterranean and Black Seas	A rare species in the Mediterranean, where individuals and pods may stray from the warmer waters of the Atlantic Ocean, and perhaps from the Red Sea through the Suez Canal as Lessepsian immigrants. Known occurrences of false killer whales in the Mediterranean are listed in Table 12. Not known to have occurred in the Marmara or Black Seas.

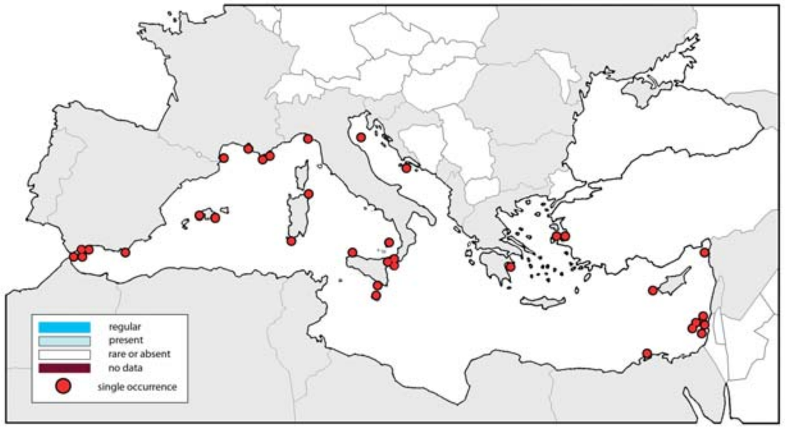


Fig. 34. Known occurrences of *Pseudorca crassidens* in the ACCOBAMS area (details in Table 12).

Habitat and ecology	A typical inhabitant of the oceanic domain, but often also found over steep slope areas and continental shelf waters, preferably at low latitudes. Often occurs in large (several 10s) pods. Feeds primarily on cephalopods and fishes (often of large size), but also known to attach other cetacean species.
Population data	No viable population is known to live in the Mediterranean or Black Seas.

Date	Location	Sex	Size	Notes	Reference
1787 (22 Jun)	Gulf of Saint-Tropez, France			Several individuals captured from a large pod. Specimen material destroyed during the French Revolution, but crania described in Bonnaterre 1789	Paulus 1963
1857 (Jun)	Elne, Pyrénées Orientales, France			Young specimen stranded	Paulus 1963 quoting Van Beneden & Gervais 1868
1877	Palermo, Italy			Skull collected; possibly same as 4 m specimen stranded in Jun 1876 near Trabia, quoted by Gliglioli 1882	Riggio 1882 in Cagnolaro et al. 1989, Giglioli 1882
1893 (8 Feb)	Camogli, Italy	F	4 m	Stranded. Skeleton mounted in the Genoa museum	Vinciguerra 1926, Paulus 1963, Arbocco 1969
1900	Sicilian waters			2 captured, skulls preserved in Calci (Pisa) Museum	Vinciguerra 1926
1926 (Apr)	Catona, Calabria, Italy			Stranded	Vinciguerra 1926, Paulus 1963
1930 (Jun)	Marbella, Spain			Stranded	Paulus 1963, Castells & Mayo 1994
1933 (Feb)	Strait of Messina, Sicily			About 30 preying on bluefin tuna; 2 captured	Beltrame 1933, Scordia 1939, Orsi Relini & Cagnolaro 1996
1936 (27 Oct)	Korčula, Croatia		1.80 m	By-caught	Hirtz 1937
1939 (Feb)	Strait of Messina, Sicily			Pod of about 100 sighted, preying on bluefin tuna	Scordia 1939
1943 (16 Mar)	Majorca, Spain		4.41 m	Captured	Casinos & Vericad 1976 citting Massuti 1943, Castells & Mayo 1994
1948 (Nov). Due to an inconsistency in the report, year could also be 1928	Off Port-de-Bouc, near Marseilles, France		4.8 m	Captured in tuna net	Paulus 1963
1951 (Aug)	Ile du Levant, France			Stranded	Paulus 1963
1955 (31 Jul)	Malta fish market			Captured, sold as bait for £ 1	Lanfranco 1969
1955 (year of report; no event date specified)	2 miles north of Baltim, Nile's Delta, Egypt			Fragment of skull found on beach	Wassif 1956, Marchessaux 1980
Between 1959 and 1961	Northern Adriatic Sea, Italy			7 captured from a pod of 30-40; 4 escaped, 2 killed, 1 kept for a few days in captivity	Stanzani & Piermarocchi 1992
1966 (3 Sep)	20 n.m. east of Marbella, Spain			Pod of about 20 sighted	Pilleri 1967, Busnel & Dziedzic 1968, Castells &Mayo 1994
Sometime between 1978 and 1982	Off the Tyrrhenian coast of Calabria, Italy			2 captured in drifting longline	Di Natale & Mangano 1983
1988 (Mar)	Colonia de San Pedro, Majorca, Spain			Stranded adult	Castells & Mayo 1994
1988 (20 May)	Gela, Sicily	M	4.60	Stranded. Skeleton mounted in the Milan Museum	Cagnolaro et al. 1989, Centro Studi Cetacei 1990
1989 (22 Nov)	S. Margherita di Pula, Sardinia, Italy	F	4 m	Stranded	Centro Studi Cetacei 1991
1989	Strait of Gibraltar			Pod of about 15 sighted	Castells & Mayo 1994
1991 (1 May)	Capriccioli, Sardinia, Italy		about 6 m	Stranded in advanced decomposition	Centro Studi Cetacei 1994
1991 (22 Jun)	Few km south of Lattakia, Syria			Skull found on beach	Kasparek 1997
1992	Aegean Sea between Chios Island (Greece) and Chesme (Turkey)			Pod of >7 sighted and photographed	Frantzis et al. 2003
1993	Argolikos Gulf, Aegean Sea, Greece			Stranded	Frantzis et al. 2003
1995	Izmir Bay, Turkey			Stranded alive	Öztürk & Öztürk 1998, Frantzis et al. 2003, Güçlüsoy et al. 2004, Güçlüsoy 2005
1995 (3 Sep)	Carboneras, Andalusia, Spain			Pod of 8 sighted	Sagaminaga & Cañadas 1997
2003 (28 Mar)	70 n.m. west of the Israeli coastline			Pod of about 20 sighted and photographed	Scheinin et al. 2004
2004 (30 Jun)	Nature reserve of Habonim, Israel			Stranded in advanced decomposition	D. Kerem & A. Scheinin, in litt.
2005 (24 Apr)	50 n.m. west of Haifa			Pod sighted and filmed	A. Scheinin, in litt.
2006 (26 May)	20 n.m. west of northern Israel			Pod of 2 sighted	A. Scheinin, in litt.
2007 (Jun)	west of Cyprus in waters 941 m deep			Pod sighted	Boisseau et al. 2010
2010 (20 Jul)	30 n.m. west of Haifa, Israel			Pod of 3 sighted	A. Scheinin, in litt.

Table 12. Known occurrences of *Pseudorca crassidens* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006). Note: Seven sightings by non-specialists reported by McBrearty et al. (1986) are not listed above because insufficiently documented.

• 5.3. Vagrant species

Fig. 35. A sei whale, *Balaenoptera borealis,* sighted off the Azores. Photograph by Justin Hart, CetaceanWatching, Azores

Common name	**Sei whale**
scientific name	*Balaenoptera borealis* Lesson 1828
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Mysticeti** Family: **Balaenopteridae** Genus: ***Balaenoptera***
world distribution	A cosmopolitan species occurring mainly offshore in the North Atlantic, North Pacific and Southern Hemisphere, but probably not in the Northern Indian Ocean (Rice 1998).

Territorial waters of:	Visitor	Possibly Visitor	Vagrant	Other
Albania				
Algeria				
Bosnia and Herzegovina				
Croatia				
Cyprus				
Egypt				
France			●	
Gibraltar (UK)				
Greece				
Israel				
Italy				
Lebanon				
Libya				
Malta				
Monaco				
Montenegro				
Morocco				
Palestinian Territory				
Portugal		●		
Slovenia				
Spain			●	
Syria				
Tunisia				
Turkey				

Occurences in the Mediterranean and Black Seas	Rare sightings and strandings reported from Spain and France (see Table 13). Present but rare in the Contiguous Atlantic Area. No records exist for the Marmara and Black Seas.

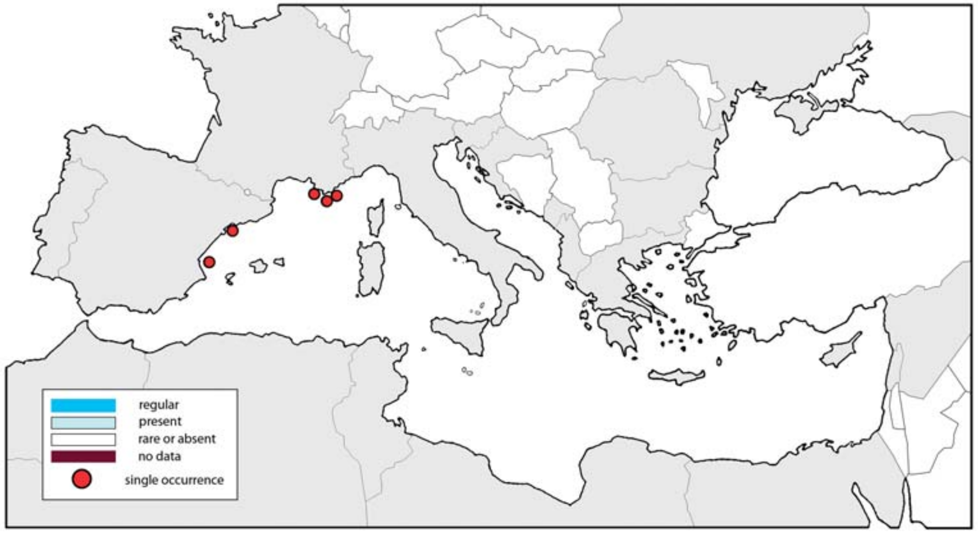


Fig. 36. Known occurrences of *Balaenoptera borealis* in the ACCOBAMS area (details in Table 13).

Habitat and ecology	Mostly found in oceanic, productive waters having temperatures comprised between 8° and 25°C. Feeds mostly on planktonic crustaceans (copepods or euphausiids, depending on location).
Population data	No viable populations are known to live in the Mediterranean and Black Seas.

Date	Location	Sex	Size	Notes	Reference
1921 (5 Jun)	Valréas, Hérault, France		15.2 m	Stranded, photographic documentation available	Beaubrun 1995, Bompar 2000
1952 (1 Jun)	off Valencia, Spain			Albino specimen sighted and filmed by Alain Bombard	Bompar 2000
1973 (25 Sep)	Punta del Fangar, Ebro Delta, Spain	F	7.30 m	Stranded alive	Casinos & Vericad 1976
1987 (Aug)	off Port Cros, France			Group of 2 sighted	Bompar 2000
1987 (30 Sep)	25 n.m. offshore, Var, France			Group of 2 sighted, identification considered certain	Bompar 2000

Table 13. Known occurrences of *Balaenoptera borealis* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006). Note: The following reports of sei whales in the Mediterranean were omitted from the list above: (a) an undocumented sighting of 10 sei whales in the Gulf of Genoa mentioned by Horwood (1987), quoting Kirpichnikov (1950); (b) a young rorqual captured near Tunis on 21 Oct. 1949, identified as *B. borealis* by Heldt (1949), considered doubtful by Ktari-Chakroun (1980); (c) unsubstantiated occurrences in the Adriatic in 1880 and in the Gulf of Taranto (Ionian Sea) in the late 1940s (Bompar 2000). For a summary of occurrences and catches of sei whales in the Strait of Gibraltar and in the Contiguous Atlantic Area, see Horwood (1987).

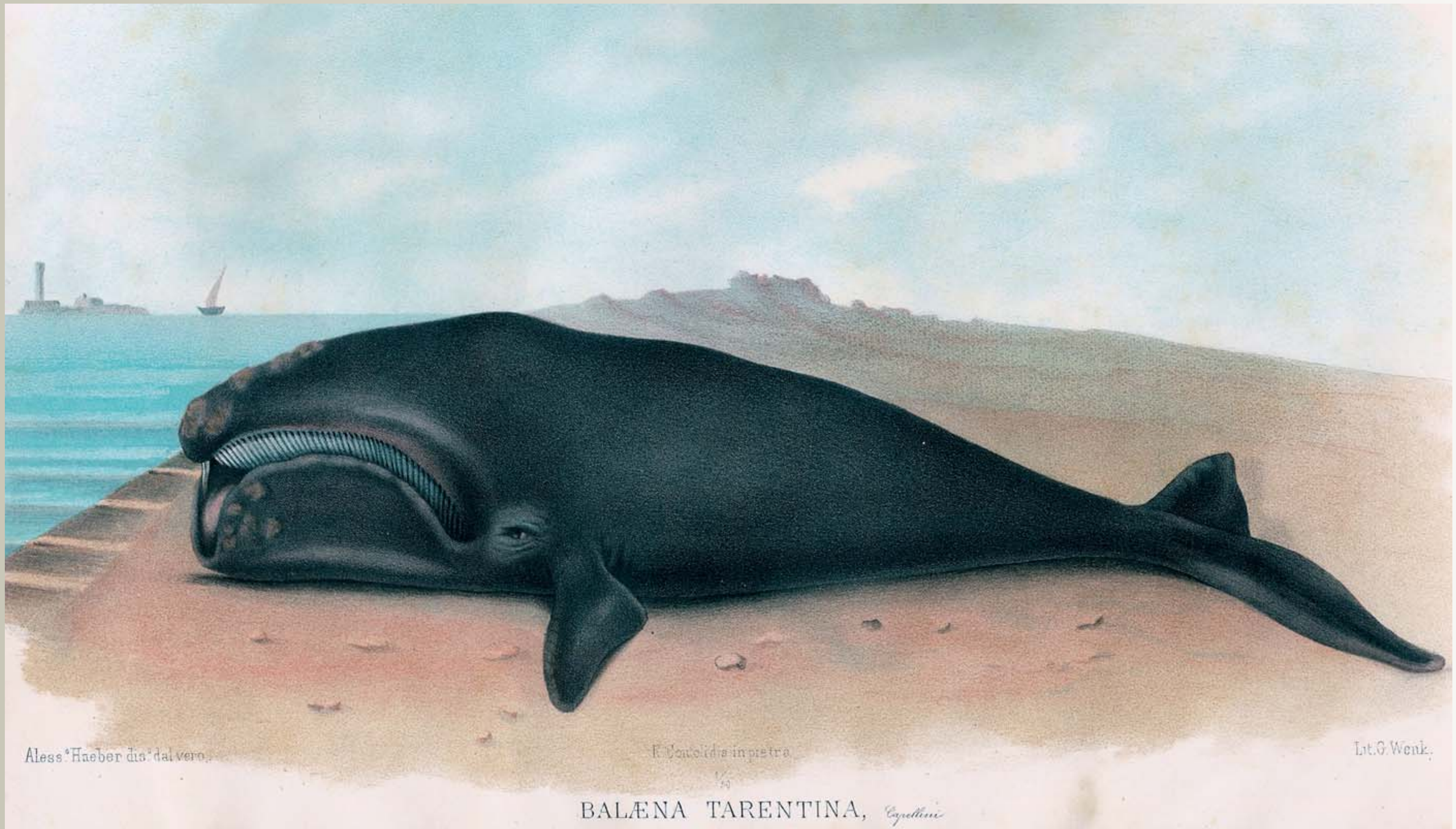


Fig. 37. A gouache painting of the specimen of northern right whale *(Eubalaena glacialis)* captured in Taranto, southern Italy, in 1877. Reproduced from Capellini 1877b.

Common name	North Atlantic right whale
scientific name	*Eubalaena glacialis* (Müller 1776)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Mysticeti** Family: **Balaenidae** Genus: ***Eubalaena***
world distribution	Once widely distributed across the North Atlantic, where it migrated between polar and sub-polar (summer) and temperate and sub-tropical (winter) waters. Now a small, endangered nucleus of approx. 300-350 individuals remains off the east coast of the North American continent. Probably extirpated from the north-eastern Atlantic.

Territorial waters of:	Visitor	Possibly Visitor	Vagrant	Other
Albania				
Algeria			●	
Bosnia and Herzegovina				
Croatia				
Cyprus				
Egypt				
France				
Gibraltar (UK)				
Greece				
Israel				
Italy			●	
Lebanon				
Libya				
Malta				
Monaco				
Montenegro				
Morocco				
Palestinian Territory				

Territorial waters of:	Visitor	Possibly Visitor	Vagrant	Other
Portugal	●			
Slovenia				
Spain				
Syria				
Tunisia				
Turkey				

Occurrences in the Mediterranean and Black Seas

Two certain occurrences of this species were recorded in the Mediterranean Sea in historical times (see Table 14), clearly of North Atlantic origin. The lack of even rare occurrences during the last century is likely a consequence of the extirpation of the species from the north-eastern Atlantic.

Has not occurred in the Marmara or Black Seas.

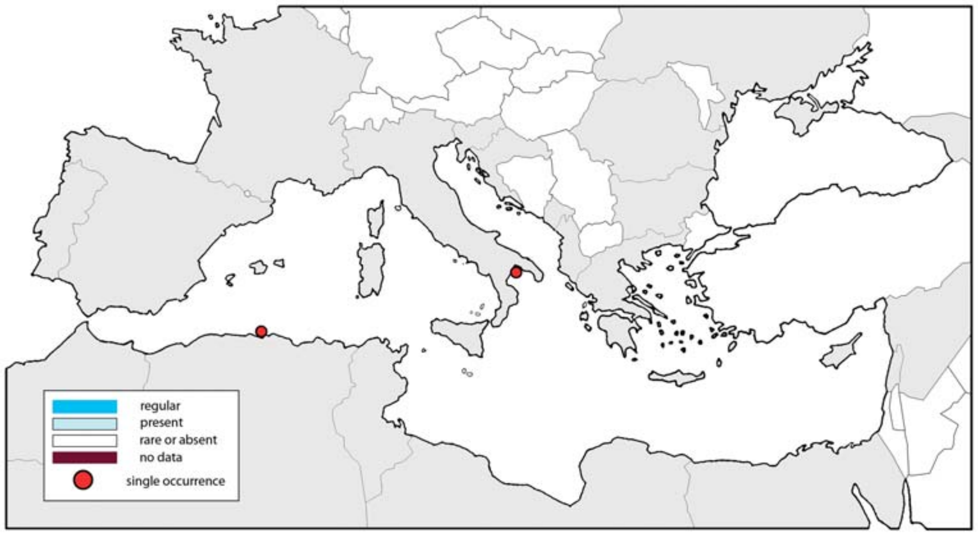


Fig. 38. Known occurrences of *Eubalaena glacialis* in the ACCOBAMS area (details in Table 14).

Habitat and ecology	Coastal habits during feeding and breeding seasons. Can cross deep ocean basins when migrating. Feeds on calanoid copepods and other small planktonic invertebrates.
Population data	No viable populations are known to live in the Mediterranean and Black Seas.

Date	Location	Sex	Size	Notes	Reference
1877 (9 Feb)	Taranto, Italy	F	12 m	Captured. Skeleton mounted in the Naples Museum.	Capellini 1877, Gasco 1878
1888 (20 Jan)	Bay of Castiglione near Algiers, Algeria		11 m	one of 2 sighted, captured. Skeleton in the Paris Museum.	Pouchet & Beauregard 1888, Bompar 2000

Table 14. Known occurrences of *Eubalaena glacialis* in the Mediterranean (adapted from Reeves & Notarbartolo di Sciara 2006).
Note: A reported sighting in May 1991 of a right whale off S. Antioco, south-western Sardinia, Italy (Rossi 1996, Bompar 2000), is not listed above.
Although underwater photographic documentation of the sighting exists, unambiguously depicting a right whale, repeated attempts always failed to contact the photographer to obtain detailed information on such an extraordinary occurrence. Out of caution the sighting is therefore considered doubtful, pending confirmation.

Fig. 39. A grey whale *(Eschrichtius robustus)* visiting the Mediterranean Sea from distant North Pacific waters in spring 2010, shows its flukes at the beginning of a dive. Photograph by Dr. Aviad Scheinin, IMMRAC, University of Haifa.

Common name	Gray whale
scientific name	*Eschrichtius robustus* (Lilljeborg 1861)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Mysticeti** Family: **Eschrichtiidae** Genus: ***Eschrichtius***

world distribution	Today the species is only found in the North Pacific and adjacent waters, but was once present also in the North Atlantic (on the eastern seaboard of North America from Florida to New Jersey and on the coasts of the English Channel and the North and Baltic Seas) until the late XVII cent. The species is now subdivided into two populations: a large (15,000-22,000) eastern North Pacific population, summering and feeding in the Chukchi, Beaufort, and northwestern Bering seas, and breeding in Mexico; and a small (113-130), critically endangered western North Pacific population, summering in the Okhotsk Sea.
occurrences in the Mediterranean and Black Seas	On 8 May 2010 a gray whale was sighted and photo-identified off Jaffa, Israel (D. Kerem, in litt.). The same individual was sighted again on 6 June of the same year off Barcelona, Spain (M. Gazo, in litt.). How did a gray whale venture into the Mediterranean Sea from its North Pacific haunts is still a matter of speculation. Never occurred in the Marmara or Black Seas.
habitat and ecology	Gray whales are primarily bottom feeders (their prey including swarming mysids, tube-dwelling amphipods, and polychaete tube worms) and are thus largely restricted to shallow continental shelf waters for feeding (Reilly et al. 2008).
population data	No viable populations are known to live in the Mediterranean and Black Seas.

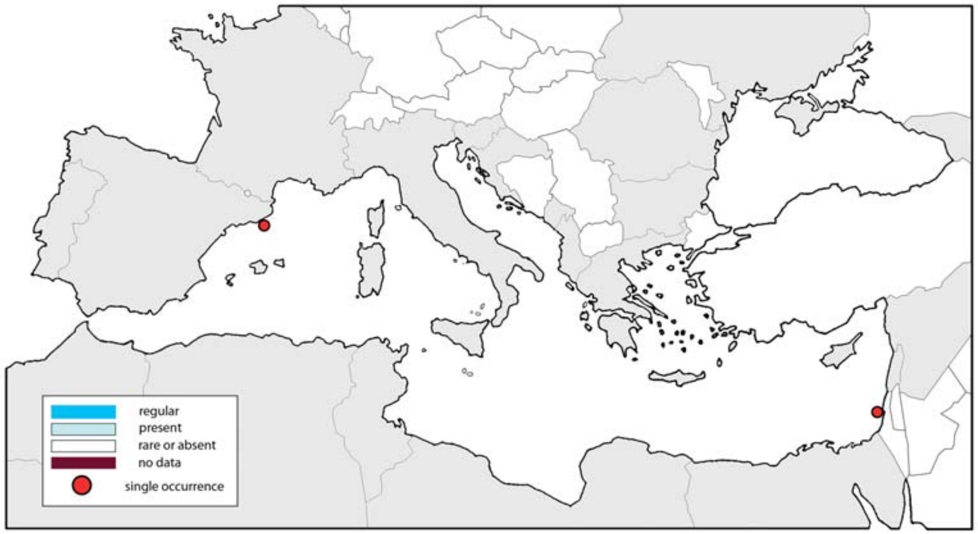


Fig. 40. Known occurrences of *Eschrichtius robustus* in the ACCOBAMS area.

Fig. 41. A male dwarf sperm whale *(Kogia sima),* stranded near Agrigento, Sicily, in September 2002. Rehabilitation attempts having failed, the specimen's skeleton is now conserved at the museum of Comiso. Photograph by Gianni Pavan/CIBRA.

Common name	Dwarf sperm whale
scientific name	*Kogia sima* (Owen 1866)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Kogiidae** Genus: ***Kogia***

world distribution	Scant data, mostly deriving from the stranding and bycatch record (due to difficulty of identifying the species at sea), indicate a circumglobal distribution, with a clear preference for tropical and warm temperate waters (Rice 1998).
occurrences in the Mediterranean and Black Seas	Two strandings of dwarf sperm whales are known to have occurred in the Mediterranean, both in Italy: 1. one specimen 2.2 m long, sex unknown, stranded dead near Foce del Chiarone, Grosseto on 24 May 1988. Its skeleton is preserved in the collections of the Accademia dei Fisiocritici of Siena (Baccetti et al. 1991); 2. one male specimen 2.07 m long, stranded alive and later died near Eraclea Minoa, Agrigento on 8 Sept. 2002. Its skeleton is preserved in the collections of the Museo Marino of Comiso (Centro Studi Cetacei 2004). Never occurred in the Marmara or Black Seas.
habitat and ecology	No information on habitat preference in the Mediterranean exists, given that the only specimens on record for th e region were strandlings. Scant knowledge from elsewhere indicates that *K. sima* is a deep water species, found preferably in correspondence of steep continental slopes, where it feeds on cephalopods (Rice 1998).
population data	No viable populations are known to live in the Mediterranean and Black Seas.

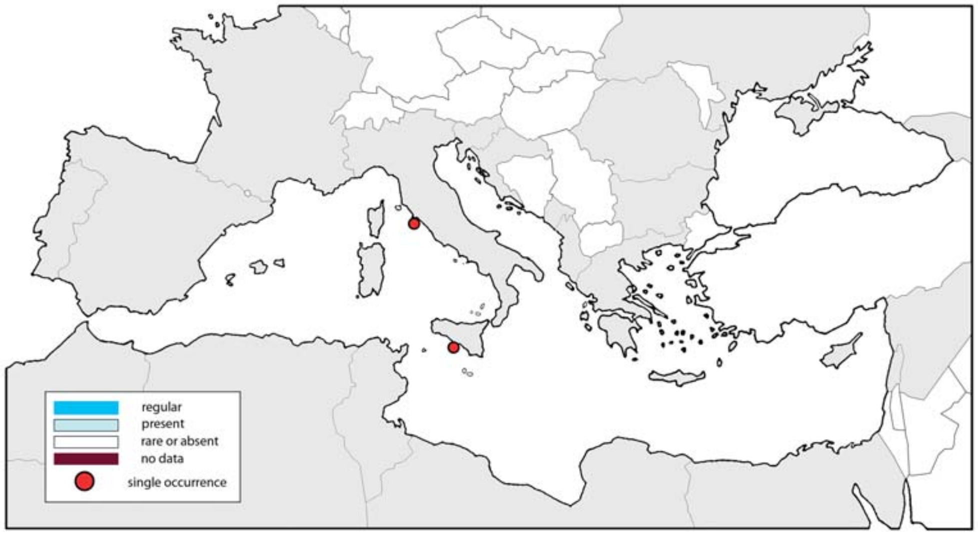


Fig. 42. Known occurrences of *Kogia sima* in the ACCOBAMS area.

Fig. 43. A northern bottlenose whale, *Hyperoodon ampullatus*, sighted off the Azores. Photograph by Justin Hart, CetaceanWatching, Azores.

Common name	Northern bottlenose whale
scientific name	*Hyperoodon ampullatus* (Forster 1770)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Ziphiidae** Genus: ***Hyperoodon***
world distribution	Temperate and sub-polar waters of the North Atlantic Ocean.
occurrences in the Mediterranean and Black Seas	Two certain occurrences of this species were recorded in the western Mediterranean Sea in historical times (see Table 15). Has not occurred in the Marmara or Black Seas.
habitat and ecology	Found mostly beyond the continental shelf, in deep slope and oceanic waters, and over submarine canyons.
population data	No viable populations are known to live in the Mediterranean and Black Seas.

Fig. 44. Known occurrences of *Hyperoodon ampullatus* in the ACCOBAMS area.

Date	Location	Sex	Size	Notes	References
1880 (26 Sep.)	Gulf of Aigues-Mortes, Languedoc-Roussillon, France	F, ?	9 m, 5 m	Mother and calf stranded alive and captured. Accurate drawings, descriptions and measurements.	Clément 1881, Bompar 2000
None provided	Alborán Sea off Spain			Sighting mentioned. Reliable description given by A. Cañadas, pers. comm.	Cañadas & Sagarminaga 2000

Table 15. Known occurrences of *Hyperoodon ampullatus* in the Mediterranean (adapted from Reeves and Notarbartolo di Sciara 2006). Note: Several reports of *Hyperoodon ampullatus* from the Mediterranean turned out to be misidentified *Ziphius cavirostris* or remain doubtful, and were therefore not listed above. These include: (a) the capture of a Cuvier's beaked whale in Liguria reported by Mezzana (1900); (b) doubtful occurrences off Tuscany in 1835, off Languedoc, near Fontignan in 1850, and off Corsica, all mentioned by Bompar (2000); (c) an undocumented sighting reported by casual observers to McBrearty et al. (1986); (d) two Cuvier's beaked whales misidentified as *H. ampullatus* off Croatia: one specimen captured near Cavtat in 1939, reported by Hirtz (1940), and a second specimen that remained for a while in Župski Bay, near Cavtat, in March 2001, before dying (cf. Holˇcer et al. 2003).

Fig. 45. A *Mesoplodon* (possibly *M. europaeus*), stranded alive near Fethiye, Turkey, in January 2009, is escorted to deep waters and released by volunteers (see Table 16). Photograph courtesy of SAD DEMAG.

Common name	Blainville's beaked whale
scientific name	*Mesoplodon densirostris* (Blainville 1817)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Ziphiidae** Genus: ***Mesoplodon***
world distribution	Circumglobal in tropical and temperate waters. Probably the *Mesoplodon* species having the widest global distribution.
occurrences in the Mediterranean and Black Seas	The only confirmed occurrence of this species in the Mediterranean refers to the stranding of a female 4.21 m long on the Beach of Alcossebre, Castellò de la Plana (Catalonia) on 17 Feb. 1980. Never occurred in the Marmara or Black Seas.
habitat and ecology	Found in deep waters, frequently off remote oceanic islands such as Hawaii, Bahamas and the Canaries. Feeds on cephalopods and deep-sea fishes.
population data	No viable populations are known to live in the Mediterranean and Black Seas.

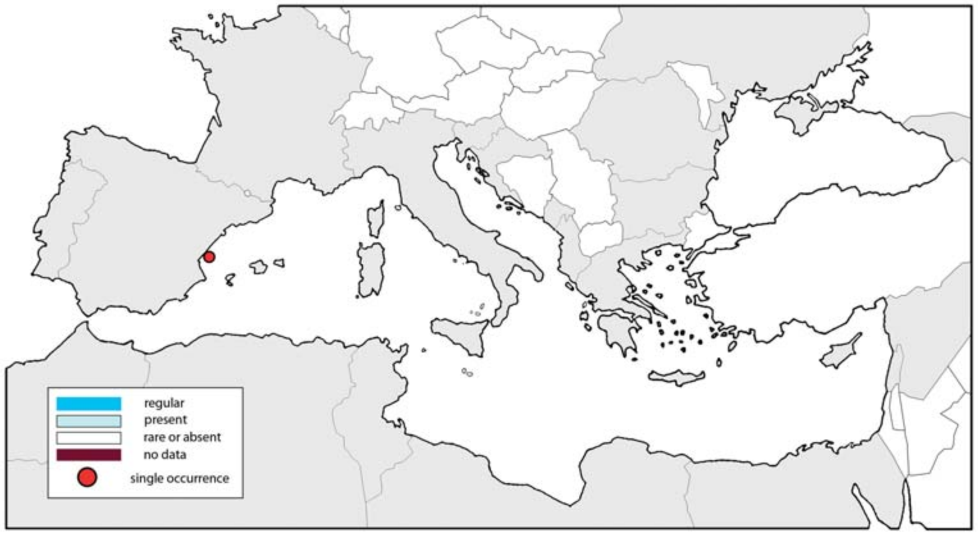


Fig. 46. Known occurrence of *Mesoplodon densirostris* in the ACCOBAMS area.

Common name	Gervais' beaked whale
scientific name	*Mesoplodon europaeus* (Gervais 1855)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Ziphiidae** Genus: ***Mesoplodon***
world distribution	Gervais' beaked whales occur between temperate North Atlantic waters (south to a line between Ireland and Cape Cod) and tropical Central Atlantic between southern Brazil and Angola.
occurrences in the Mediterranean and Black Seas	Known from only one specimen, a female 4.5 m long stranded near Castiglioncello (Livorno, Italy) on 9 Aug. 2001. The skeleton is conserved at the Civic Museum of Natural History of Milan (Podestà et al. 2005). Never occurred in the Marmara or Black Seas.
habitat and ecology	Found mostly in deep waters. Feeds on squid and mesopelagic fishes.
population data	No viable populations are known to live in the Mediterranean and Black Seas.

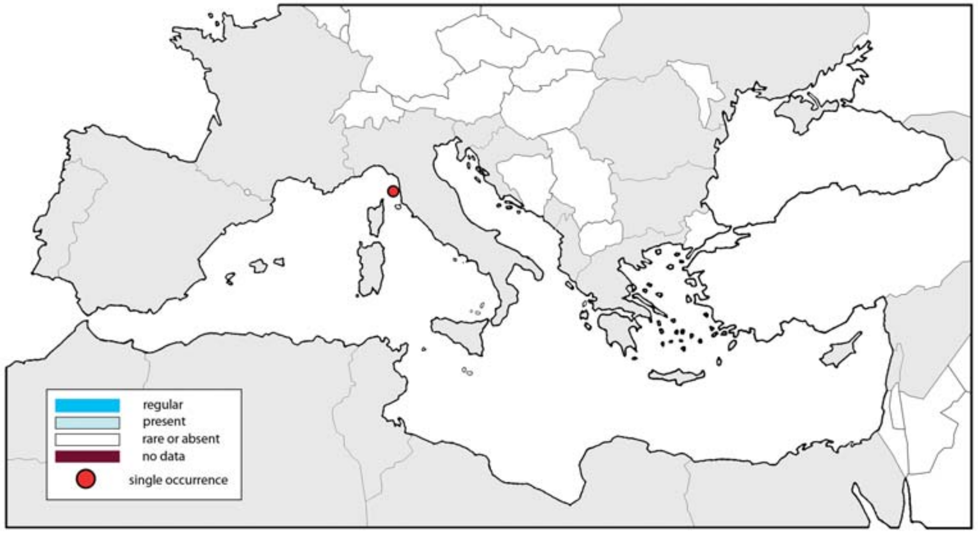


Fig. 47. Known occurrence of *Mesoplodon europaeus* in the ACCOBAMS area.

In addition, the following *Mesoplodon* specimens (species unidentified) were found in the Mediterranean:

Date	Location	Sex	Size	Notes	References
1927 (9 Nov)	Foce Verde, Latina, Italy	F		Stranded. Genus identified from position of teeth in the mandible. Reputed *M. bidens* by the authors, but no supporting argumentation provided.	Brunelli & Fasella 1928
1996 (15 Aug)	Iles des Lérins, Alpes-Maritimes, France			Two stranded alive, released without collecting tissue samples or other evidence to confirm identity. Possibly *M. bidens*.	Bompar 2000
2009 (9 Jan)	Fethiye, Turkey	F	5-6 m	Possibly *M. europaeus*, stranded alive and released at sea.	Ozgur Kesapli Didrickson, SAD-DEMAG, pers. comm. (see Fig. 45).

Table 16. Known occurrences of *Mesoplodon sp.* in the Mediterranean.

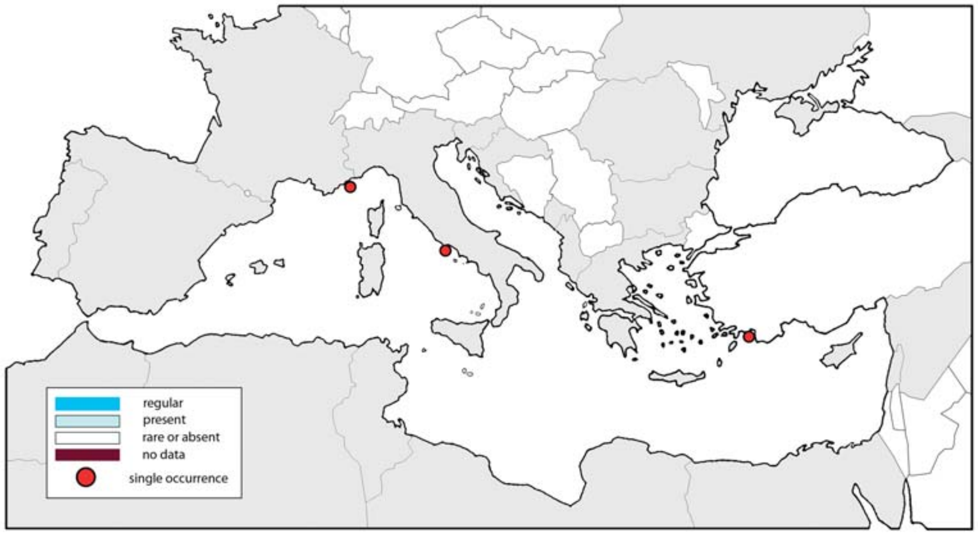


Fig. 48. Known occurrences of *Mesoplodon sp.* in the ACCOBAMS area (details in Table 16).

• 5.4. *Alien species*

Common name	Indo-Pacific humpback dolphin
scientific name	*Sousa chinensis* (Osbeck 1765)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Delphinidae** Genus: ***Sousa***
world distribution	Tropical Indian Ocean, Red Sea, and Indo-Pacific region up to the eastern coast of Australia and Taiwan.
occurrences in the Mediterranean and Black Seas	Individuals are occasionally reported to stray into the Mediterranean (Egypt, Israel) from the Red Sea through the Suez Canal as Lessepsian immigrants. Instances include: 1. sightings at the entrance of Port Said harbour, Egypt (Marchessaux 1980, quoting Mörzer-Bruyns, pers. comm.); 2. successive documented sightings in Israel (Bay of Atlit, 10 Jan. 2000; inside Jaffa harbour, 18 Jan. 2000; inside Ashhdod harbour, 20 Jan. 2000)(Scheinin et al. 2004). *S. chinensis* is considered an alien species in the Mediterranean because it would not have reached the region were it not for human intervention (the cutting of the Suez Canal). The species never occurred in the Marmara or Black Seas.
habitat and ecology	A typically neritic species, found over the continental shelf, bays and estuaries and mouths of large rivers.
population data	No viable populations are known to live in the Mediterranean and Black Seas.

Fig. 49. Known occurrences of *Sousa chinensis* in the ACCOBAMS area.

Common name	Beluga, or White whale
scientific name	*Delphinapterus leucas* (Pallas 1776)
taxonomy	Class: **Mammalia** Order: **Cetacea** Sub-order: **Odontoceti** Family: **Monodontidae** Genus: ***Delphinapterus***
world distribution	The species is distributed almost circumglobal in high latitudes of the Northern Hemisphere, including seas of the Arctic Ocean, Northern Atlantic Ocean and Northern Pacific Ocean.
occurrences in the Mediterranean and Black Seas	In September 1991 two captive male belugas originating from the Okhotsk Sea (Russian Far East, Northern Pacific) were transported to Crimea (Ukraine), where they were released (or escaped) into the Black Sea just after their arrival. Both individuals were observed together in the wild in the vicinity of Sevastopol during the first few weeks after the release (escape) event. Afterwards (1992-95), only one of the animals was sighted and reported (Plotoaga & Stanciu 1995; Birkun & Krivokhizhin 1996) in different locations of the Black Sea shelf area within the boundaries of Bulgaria, Romania, Turkey and Ukraine. This individual was captured again in Gerze (Turkey) in April 1992 and again escaped from captivity in Laspi Bay (Ukraine) in November 1992.
habitat and ecology	In their native environment belugas occur in shallow coastal and deep offshore waters and, normally, visit estuaries and rivers; they undertake migrations between wintering and summering areas and prefer to overwinter in shallow or coastal waters with light or moveable ice cover (Jefferson et al. 2008). In winter 1992-93, the individual introduced in the Black Sea was observed in the shallow Dnieper-and-Boug Liman partly covered with ice (Birkun & Krivokhizhin 1996).
population data	No viable populations are known to live in the Mediterranean and Black Seas.

Fig. 50. Known occurrences of *Delphinapterus leucas* in the ACCOBAMS area.

6. What threatens cetaceans in the region

Goal of this section of the document is to present an updated review of threats to cetaceans in the ACCOBAMS area, comparing the current situation with what was described in detail in the 2002 report, and in particularly in the overview presented by Notarbartolo di Sciara et al. (2002). Accordingly, the current known or presumed status is reviewed of different threats known to affect cetaceans, including: interactions with fisheries; disturbance, injuries and mortality from shipping; habitat loss and degradation, including pollution; anthropogenic noise; direct killing and live captures; and climate and ecosystem change.

• 6.1. *Interactions with fisheries*

Interactions between cetaceans and fisheries in the ACCOBAMS area were reviewed by Bearzi (2002) for the Mediterranean and by Birkun (2002b) for the Black Sea.

Work to monitor cetacean bycatch and depredation in the ACCOBAMS area has made considerable progress during the last decade. A meeting held in Sept. 2008 at the headquarters of FAO, Rome, provided, amongst other things, a protocol for the systematic collection of relevant data (Northridge & Fortuna 2008).

Bycatch of cetaceans in the Mediterranean and Contiguous Atlantic is mainly caused by continued fishing with large-scale pelagic driftnets, in spite of bans by GFCM, ICCAT and the European Commission, and even after the ACCOBAMS text was amended in 2007 to explicitly prohibit the use of such gear by the Parties. Very high levels of cetacean bycatches (in the order of several thousand striped dolphins and endangered short-beaked common dolphins per year) have been reported for the Moroccan driftnet fishery in the Alborán Sea (Tudela et al. 2005). Cetacean mortality (again involving endangered common dolphins) was also reported to occur in the Turkish driftnet fishery in the Aegean Sea (Akyol et al. 2005). The illegal use of driftnets also continued in France and Italy (Cornax 2007), although it has now ceased in the former; by contrast, entanglements of endangered sperm whales in illegal driftnets in southern Italian waters continue to this date (e.g., Pace et al. 2008, Anon. 2008). Supposedly, should the use of driftnets be discontinued in the Mediterranean Sea in accordance with national, regional and international law, the threat of bycatch to any cetacean population would become of secondary significance. Unfortunately, the day in which driftnets will have completely disappeared from the region is nowhere in sight.

Fig. 51. A large piece of driftnet bearing inscriptions in Turkish on its floaters was found in May 2005 abandoned near the Greek island of Samothraki, northern Aegean Sea, with the entangled carcases of 12 striped dolphins, one Risso's dolphin, a thresher shark and several thunnids. Photograph by Argyris Kallianiotis/Fisheries Research Institute, Kavala, Greece.

Incidental catch in fishing nets constitutes the most important threat and major source of human-induced mortality of Black Sea cetaceans (Birkun 2008b). Numerous incidents of bycatch occur in the Azov Sea and Kerch Strait and throughout the Black Sea shelf area, including waters under the jurisdiction of all the riparian countries (Birkun 2008d, Mikhailov 2008, Öztürk & Tonay 2008, Radu et al. 2008, Sorokin & Birkun 2008). Cetacean strandings with the obvious evidence of having been bycaught have been recorded in the Marmara Sea as well (Öztürk et al. 1999). All three Black Sea cetacean subspecies are known to be taken as bycatch, although incidental takes of endangered harbour porpoises evoke the greatest concern (Reeves et al. 2003, 2005, International Whaling Commission 2004, Birkun 2005, Birkun & Frantzis 2008). Based on older records (reviewed in Birkun 2002b) and on subsequent studies (Tonay & Öz 1999, Tonay & Öztürk 2003, Radu et al. 2008, Tonay et al. 2008, Birkun et al. 2009), during a 19-year period (1990-2008) a total of 1,126 incidentally caught cetaceans were reported for the Black Sea, including 1,089 harbour porpoises (96.7%), 17 common dolphins (1.5%) and 20 bottlenose dolphins (1.8%). Almost all (99.9%) recorded incidents were lethal.

Fig. 52. Victims of the turbot fishery: two Black Sea harbour porpoises, an adult female and a calf. Photograph by Sergey Krivokhizhin/Brema Laboratory.

Absolute numbers of population losses due to bycatch have not been estimated for Black Sea cetaceans, and the above figures are considered a gross underestimate. Preliminary indications suggest that the annual level of harbour porpoise bycatches may be numbered in the thousands per year and is unsustainable, whereas the incidental mortality of bottlenose dolphins in fishing gear is in the 100s/year (Öztürk 1999, Birkun 2008b, Birkun & Frantzis 2008). The porpoises and dolphins are caught in a variety of fisheries, although bottom-set gillnets with large mesh size (from 80-220 mm) are the most damaging, given that > 99% of the recorded bycatches occur in this gear (Birkun 2008d). In 2006-2008, during an onboard examination of 3,604 bottom-set gillnets with an overall length of 278 km, a total of 484 bycaught cetaceans (480 harbour porpoises and four bottlenose dolphins) were found, whereas the catch of target fish species came to 4,751 Black Sea turbots and 1,830 spiny dogfishes (Birkun et al. 2009). Aggregate bycatch indices of those fishing operations were evaluated as follows: 163 porpoises and two bottlenose dolphins per 100 km of turbot nets; 195 porpoises per 100 km of dogfish nets; 67 porpoises and one dolphin per 1000 turbots; and 88 porpoises per 1000 dogfishes. Peaks of harbour porpoise bycatches occurred in June (2.7/km of turbot nets) and August (7.6/km of dogfish nets) (Birkun et al. 2009). It should be underlined that such depressing statistics were obtained from just one fishing boat legally operating in small coastal area in Ukraine. In the meanwhile, hundreds of vessels are permitted annually to catch turbot and dogfish in the region. In addition, illegal, unreported or unregulated (IUU) fishing became widespread in the Black and Azov Seas in the past two decades (e.g., Shlyakhov & Daskalov 2008) suggesting that a significant share of cetacean bycatches takes place due to marine poaching.

Two other aspects of cetacean/fisheries interactions continue to be problematic in the Mediterranean and Black Seas: a) operational interactions involving depredation of nets by odontocetes, and b) ecological interactions resulting in the depletion of prey for cetaceans.

Fig. 53. Killer whales in the Strait of Gibraltar compete with Moroccan fishermen for a dwindling prey, the endangered North Atlantic bluefin tuna. Photograph by Renaud de Stephanis/CIRCE.

Operational interactions involving depredation of nets by odontocetes. Depredation still widely occurs in the area, mostly by bottlenose dolphins (Yassine et al. 2004, Diaz Lopez 2006, Lauriano et al. 2009). Killer whales are also involved in competitive activities with Moroccan fishermen targeting bluefin tuna crossing the Strait of Gibraltar (de Stephanis et al. 2002). Evidence was presented that the economic impact of depredation on fishing activities exists, however not as heavy as could be expected on the basis of some fishermen's complaints (Lauriano et al. 2004, Gazo et al. 2008, Rocklin et al. 2009, Bearzi et al. 2010a). Research continued to investigate and experiment with ways to address the problem of depredation by bottlenose dolphins on artisanal gillnets. Results from experiments with pingers in the Baleares (Brotons et al. 2008, Gazo et al. 2008) were encouraging but did not account for the possibility of habituation. Under the auspices of the ACCOBAMS' Scientific Committee a set of documents to support addressing the problem of depredation were produced. These include: guidelines concerning technical measures to minimise cetacean–fishery conflicts in the ACCOBAMS area (Northridge et al. 2010); guidelines for the testing and use of acoustic mitigation devices (AMD) for depredation mitigation (Dalgaard Balle et al. 2010a); and a review of the effectiveness of acoustic devices and depredation mitigation as demonstrated in field studies to date (Dalgaard Balle et al. 2010b). In particular, Dalgaard Balle et al. (2010b) concluded:

"To date the only example of AMDb *[= Acoustic Mitigation Devices - bycatch]* reducing cetacean bycatch rates to zero is for beaked whales in the Californian drift gill net fishery. For mobile fishing gear two models of AMDb currently show promise of being useful at reducing at least common dolphin bycatch in pelagic pair trawls: the CetaSaver and the DDD02F. It is clear from the literature that bycatch reduction is not consistent across AMDs, species or fisheries indicating that AMDs do not offer a simple panacea to this problem.

"The results of trials investigating the effectiveness of AMDd *[= Acoustic Mitigation Devices - depredation]* at reducing cetacean depredation in fisheries are more ambiguous. Although some studies indicate that bottlenose dolphin depredation of static gear may be reduced in the short term (up to 3 years depending on species and fishery involved) by deploying AMDd, to date there is no indication that these devices will remain successful over longer periods than this. Given the fact that bottlenose dolphins are extremely adaptable and plastic in the way in which they learn new behaviours, the possibility that AMDs may become a "dinner bell" and thereby increase depredation and possibly entanglement should not be ignored."

Very little information exists concerning the influence of cetaceans on commercial fisheries in the Black Sea (including the depredation and supposed depletion of fishing resources) (Birkun 2008d). Coastal fishermen usually have no claims against common dolphins and harbour porpoises but mention episodes in which bottlenose dolphins raise trouble by damaging their nets or catch, or by stealing fish from the nets. By contrast, pelagic fishermen using midwater trawls report that common dolphins can snatch fish from the trawl. So far no statistics is available in the Black Sea region on cetacean depredation and ensuing financial losses. No relevant research was undertaken by the riparian countries in spite of requests from the fishing community (e.g., Violin Raykov 2009, pers. comm.). Some fishermen believe that cetaceans are their competitors. In particular, fishermen interviewed in Bulgaria claim catch losses incurred in, due to cetaceans in coastal pound nets, totalling up to 100 tonnes of fish per season (Mikhailov 2008). The isolated cases of deliberate killing and harassment (frightening by pyrotechnic means and fire-arms) are known to occur as a result of adverse interaction between dolphins and coastal fisheries. For instance in 2004, at least two bottlenose dolphins were reportedly shot in Balaklava, Ukraine (Birkun 2008b).

Ecological interactions resulting in the depletion of prey for cetaceans. Instances in which a decline of marine apex predators in the Mediterranean, including endangered common dolphins, was likely induced by overfishing causing prey depletion were investigated in the eastern Ionian Sea (Bearzi et al. 2006, 2008, 2010, Piroddi et al. 2010) and in the western Mediterranean (Cañadas & Hammond 2008). A call to attract the attention of the public and decision makers on the need for urgent action to conserve one of the last strongholds of common dolphins in the Mediterranean was widely diffused in 2009, and posted on the Internet (http://www.cetaceanalliance.org/call/). Unfortunately, the appeal did not achieve observable results. Prey depletion (bluefin tuna) is also presumed to be a threat to a small population of killer whales in the Strait of Gibraltar (de Stephanis et al. 2005a).

Such instances are likely to occur with increasing frequency in the region if overexploitation of fishery resources will continue (Piroddi et al. 2010), and if fishing nations in the Mediterranean will fail in their obligation to apply an ecosystem approach to fisheries management, as requested by law (Commission of the European Communities 2008). Ecosystem-based fishery management requires taking account of indirect effects (such as habitat destruction, incidental mortality, and competition between the fishery and marine mammals or birds) and dealing with non-commensurate values, such as yield from the fishery and production of offspring by the birds or mammals competing for the same resource (Richerson et al. 2010).

In the late 1980s–early 1990s, overfishing combined with habitat deterioration (see 6.3) have caused a severe decline in the populations of some Black Sea fish species including indigenous anchovy, sprat, horse mackerel and mullets (e.g., Prodanov et al. 1997, Zaitsev & Mamaev 1997) which represent the basic prey of Black Sea cetaceans (Birkun 2008a, Krivokhizhin & Birkun 2009). The reduced prey availability coincided with four mass mortality events that affected all the three cetacean species in 1989-97 (Krivokhizhin 2009). The correlation between the die-offs of Black Sea cetaceans and prey scarcity could signify that the reduced prey availability compromised the health of the cetaceans and increased their susceptibility to infection. Since the mid-1990s the populations of anchovy, sprat and mullet started to recover; however, the concurrent growth of fishing efforts (including IUU fishing) is feared to result in collapse again (Shlyakhov & Daskalov 2008). This concern was clearly expressed recently by the Commission on the Protection of the Black Sea Against Pollution (Black Sea Commission 2009):

> "... unsustainable/destructive fishing and harvesting practices, poaching, lack of a common and effective monitoring system of fishing activities around the Black Sea and lack of legally binding document are still the greatest bottlenecks in the region to achieve sustainable exploitation of commercially important species. Valuable commercial species are not yet recovered. The highly variable stock dynamics and the lack of effective control over the fisheries make stock collapses quite likely in future."

• 6.2. *Disturbance, injuries and mortality from shipping*

The ACCOBAMS area is one of the world's most trafficked marine regions, and the pervasive human presence at sea, aboard the highest variety of vessels, particularly in the coastal zone encroaches on cetacean habitats everywhere and provides continued and increasing opportunities for disturbance to these mammals.

The high-volume of shipping occurring in the Mediterranean (220,000 ships >100 t navigating yearly in the region, with values expected to grow 3-4- fold in the next 20 years: Panigada & Leaper in press) is a source of considerable concern in terms of impacts on cetaceans. A review of disturbance by maritime traffic (including the risk of collisions) to cetaceans in the Mediterranean was provided by David (2002). Behavioural changes in common bottlenose dolphins in the vicinity of pleasure boats were detected in Sardinia (Underhill 2006) and temporal avoidance of habitat of the same species was reported from Croatia (Bearzi et al. 2008).

Ship strikes in the Mediterranean seem to be posing the highest threat to fin and sperm whales (Pesante et al. 2002, Panigada & Leaper in press), although smaller species may also be affected (Pace et al. 2006). Panigada et al. (2006) examined records of 287 fin whales stranded in the region, and found that 26% were confirmed to have died in a ship strike. In addition, 2.4% of whales in a photo-ID catalogue of 383 bore clear marks of a collision (this small number being likely indicative of the low survival rate of collided whales). The Pelagos Sanctuary and the Gulf of Lions turned out to be among the areas of highest collision risks for fin whales (Panigada & Leaper in press). Collisions involving sperm whales are also likely to be a conservation problem, amongst others: a) along the Hellenic Trench (Greece), where 70% of stranded sperm whales bore collision marks according to data collected by the Pelagos Cetacean Research Institute from 1997 to 2007 (Panigada & Leaper in press); and b) in the Strait of Gibraltar, where intense traffic routes overlap with sperm whale critical habitat, and the effects of collisions have been recorded in several instances (de Stephanis et al. 2005b).

Fig. 54. A fin whale living dangerously in the Pelagos Sanctuary. Photograph by Souffleurs d'Ecume.

To address the conservation problems posed to cetaceans by ship strikes, ACCOBAMS organised in Monaco in Nov. 2005 a workshop on "large whale ship strikes in the Mediterranean Sea" (Weinrich et al. 2006). The meeting reviewed current knowledge on ship strikes and mortality in the region, identified the main existing information gaps, reviewed methods to address such gaps and potential mitigation measures, and provided a series of general and specific recommendations. Such recommendations were later reiterated by Italy, Spain, France and Monaco during the 59th meeting of IMO's Marine Environment Protection Committee in May 2009 (International Maritime Organization 2009). So far, however, few management actions have been undertaken in the Mediterranean to address the problem: a) a "Notice to Mariners" published in Jan. 2007 by the Spanish Navy Hydrographic Institute, broadcasted by VHF and advertised on nautical charts, establishing a security area in the Gibraltar Strait characterized by high densities of sperm whales, where crossing ships are recommended to limit their speed to a maximum of 13 knots, and to navigate with particular caution; b) the repositioning of the Traffic Separation Scheme off Cabo de Gata, in waters containing valuable and sensitive habitats for protected species (including common bottlenose dolphins) from 5 to 20 nm off the coast, as published in a "Notice to mariners" and advertised on nautical charts (Tejedor Arceredillo et al. 2008); and c) "REPCET" ("real time plotting of cetaceans"), a programme promoted by the French NGO *Souffleurs d'Écume* in cooperation, amongst others, with ACCOBAMS and with the Pelagos Sanctuary, whereby real-time (or "semi-real-time") alerts concerning concentrations of large whales within the Pelagos Sanctuary (as a pilot area) are provided by a centralises server to participating vessels on the basis of sightings of large cetaceans by watch-keeping personnel on board of the same network of vessels (REPCET 2010). A second workshop on this topic is being jointly organised by ACCOBAMS and the IWC, and will be held in southern France in September 2010.

The special case of potential disturbance to cetaceans by whale watching in the Mediterranean was reviewed by Beaubrun (2002). On the basis of a series of experiments conducted at sea, Jahoda et al. (2003) warned that even low levels of disturbance to feeding fin whales in the Pelagos Sanctuary might result in behavioural disruption which may be energetically challenging to whales. Guidelines to support Parties in the development of whale watching national regulations were developed under the auspices of the Scientific Committee of ACCOBAMS, and are available on the Agreement's website. Other initiatives to address the potential conservation concerns involved in whale watching include the development of a database of commercial whale watching operators (still significantly incomplete, likely because registering into database by commercial operators is still on a voluntary basis), and the development of an "eco-label" (still in progress) designed to stimulate the bottom-up improvement of respectful the whale watching operations.

The only country that has adopted a dedicated legislation on whale watching so far is Spain (Real Decreto 1727/2007 of 21 Dec); the law includes a set of detailed provisions and prescriptions on how to approach cetaceans at sea for touristic purposes. Disturbance to cetaceans in the Black Sea was reviewed by Birkun (2002d). It was inferred that maritime traffic affects mainly cetaceans in the areas close to large harbours and, especially, in the straits connecting the Black Sea with adjacent seas and serving as biological corridors for migrating marine animals. According to tentative expert evaluation, the disturbance by marine transport, tourism and military activities is recognized as the fourth major threat (after pollution, habitat destruction and overexploitation) to Black Sea species inserted in the IUCN Red List (Anon. 2007a) and, thus, to cetaceans. However, up to date there was no specific research and conservation project intended to address or mitigate human disturbance to Black Sea dolphins and porpoises (Black Sea Commission 2010).

• 6.3. Habitat loss and degradation, including pollution

Cetacean habitat loss and degradation in the Mediterranean Sea was reviewed by Simmonds and Nunny in 2002. In that review, habitat degradation was meant to include effects of pollution and disease, climate change (here addressed under section 6.6), land-based change, coastal development, and effects from other direct uses of the Mediterranean such as maritime traffic, fishing and aquaculture.

Chemical pollution, particularly from Persistent Organic Pollutants (POPs), trace elements and oil residues, continues to pose a threat to the region's cetaceans, however the overall picture is progressively changing. Aguilar and Borrell (2005) used stranded striped dolphins as indicators of temporal trends in DDT and PCB contamination in the offshore waters of the western Mediterranean Sea during 1987-2002, and found that dolphins still carried moderate to high levels of these chemicals in their tissues although the use of DDT and PCB was banned at the end of the 1970s-early 1980s, reflecting their ubiquity and environmental persistence. Interestingly, however, concentrations of both groups of compounds had decreased, with the decline in PCB steeper than that of DDT, indicating a decline in organochlorine pollution in oceanic waters which is consistent, albeit not always, with trends observed in coastal surveys. The situation was similar in the eastern Mediterranean, judging from levels of DDTs, PCBs and heavy metals measured in tissues of common bottlenose dolphins stranded along the Israeli Mediterranean coast during 2004–2006 (Shoham-Frider et al. 2009).
Contaminant levels indicated a progressive degradation of the remnant DDT and the absence of new inputs; in addition, blubber PCBs values in the eastern Mediterranean were one order of magnitude lower than in tissues of the same species in the western Mediterranean.

During the last decade investigations were also carried out on more novel xenobiotic chemicals, which have been increasingly produced for industrial purposes and have entered the marine food webs. Concern was raised, for example, for the diphenyl ethers (PBDEs), a class of brominated flame retardants known to be toxic (Ross 2006), that have been used extensively in electronic equipment, textiles and polyurethane foam in furniture and cars. Petterson et al. (2004) analysed PBDE levels in liver tissues of five cetacean species (fin whales, pilot whales, bottlenose dolphins, striped dolphins, Risso's dolphins) stranded in Italy, and detected the highest levels in striped dolphins. Another class of xenobiotics having a wide industrial use, fluorinated hydrocarbons, were also investigated in the Mediterranean, and found to be contained in measurable levels in tissues of bottlenose, common, striped dolphins as well as in fin and pilot whales (Kannan et al. 2002).

Oil and its derivatives continue to be a major source of concern for the Mediterranean cetaceans. Analyses published in 2002 by UNEP MAP's Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) highlighted the very high volume of oil traffic in the region (20-25% of the global total) with connected operational pollution consisting of the unlawful discharge of ballast waters, tank washing residues, fuel oil sludge and bilge waters (for an overall estimated total of 100,000-150,000 tonnes/year), and accidental pollution caused by major oil spills, so far still miraculously rare in the Mediterranean (REMPEC 2002). Current information regarding oil spill effects on marine mammals is limited. Marine mammals may be affected by the oil itself or by response activities and materials (e.g., vessel traffic, noise, dispersants). Potential behavioural responses of concern include displacement of animals from prime habitat, disruption of social structure (e.g., pods, mother-calf pairs), changing prey availability and foraging distribution and/or patterns, changing reproductive behaviour/productivity, and changing movement patterns or migration; potential physical/physiological effects of concern include: irritation, inflammation, or necrosis of skin, chemical burns of skin, eyes, mucous membranes, inhalation of toxic fumes with potential short- and long-term respiratory effects (e.g., inflammation, pulmonary emphysema, infection), ingestion of oil (and dispersants) directly or via contaminated prey, leading to inflammation, ulcers, bleeding, possible damage to liver, kidney, and brain tissues, stress from presence of vessels, aircraft, noise, handling (animals captured), and complications of the effects above that may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death (Marine Mammal Commission 2010).

Finally, one aspect of pollution which continues to raise concern is represented by the presence of abundant marine debris (Laist et al. 1999), mostly plastics (Allsopp et al. 2006), at the sea surface, in the water column, and on the sea bottom; this is a very widespread phenomenon in the Mediterranean (Triantafillou 2008), including in the Pelagos Sanctuary (Aliani et al. 2003). Cetaceans may become entangled in marine debris, and smaller fragments are often mistaken for food items and ingested, with potential detriment to the animals (e.g. Cagnolaro et al. 1986, Gomerčič et al. 2006). An assessment of the status of marine litter in the Mediterranean was performed by UNEP MAP (2009). Results emphasized the inconsistency of the available information, restricted mainly to parts of the northern Mediterranean, but confirmed that most of the region's marine litter derives from land-based sources rather than from ships. Policy reforms relating to marine litter within countries participating to the assessment were encouraged covering the whole range from waste prevention practices to environmentally sound disposal of waste. This should be further strengthened by the entry into force of the Integrated Coastal Zone Management Protocol to the Barcelona Convention. However, in spite of these welcome intentions, solid waste still enters the Mediterranean marine environment in enormous quantities.

Degradation of the marine environment may have facilitated the outbreak of severe epizootics (Van Bressem et al. 2009), which in the ACCOBAMS region involved mostly morbillivirus (reviewed by Simmonds and Nunny 2002). Several morbilliviral episodes were recorded in the Mediterranean since the 2002 review, although these have never been as severe as the major 1991-1992 outbreak. Raga et al. (2008) reported a die-off of >100 striped dolphins in July 2008 along the coast of the Spanish Mediterranean; of 10 dolphins tested, seven were positive to a virus strain closely related to the dolphin morbillivirus that was isolated during the 1990 epizootic. Between October 2006 and April 2007 an outbreak of a lethal morbillivirus infection also affected long-finned pilot whales in the Mediterranean Sea (Fernández et al. 2008); sequence analyses of a 426-bp conserved fragment of the morbillivirus phosphoprotein gene indicated that this virus was more closely related to dolphin morbillivirus than to pilot whale morbillivirus. Guidelines concerning best practices and procedures for addressing cetacean mortality events related to infectious agents, harmful algal blooms, and chemical, acoustic and biological pollution were produced in recent years under the auspices of the ACCOBAMS Scientific Committee (Van Bressem 2009a, 2009b).

Cetacean habitat loss in the Black Sea was reviewed by Birkun (2002c). There has been a profound degradation of the Black Sea environment and biodiversity between the 1970s and the 2000s, with the most dramatic period in the late 1980s and early 1990s due to a disastrous combination of: (a) excessive enrichment of seawater with nutrients, followed by eutrophication and algal and zooplanktonic blooms, impacting on benthic communities and demersal fish through hypoxia; (b) manifold water pollution including contamination by oil, xenobiotics, solid waste and opportunistic bacteria; (c) introduction and population explosion of harmful alien species and specifically *Mnemiopsis leidyi,* a comb jelly that contributed significantly to the depletion of pelagic fish productivity; (d) physical alteration of the seabed and seashore; and (e) overexploitation of marine living resources (see 6.1 for more details). This crisis of the Black Sea environment (Mee et al. 2005, Zaitsev 2006, Black Sea Commission 2008) had an impact on cetaceans at a minimum through the evident deterioration of their habitats (mainly in coastal areas and over the continental shelf), decline in prey availability, and worsening health status through an extraordinarily high bioaccumulation of toxic POPs and four outbreaks of mass mortality/epizootics including by morbillivirus in 1994 (Birkun 2008a). By contrast, trace metal levels in the tissues of Black Sea porpoises were generally low in the 1990s in comparison with conspecifics from the northeastern and northern Atlantic (Joiris et al. 2001, Das et al. 2004).

Currently, the Black Sea environment continues to be degraded, although some improvements have occurred since the mid-1990s. Between 1996 and 2005, river-borne loads of inorganic nitrogen and phosphorus declined by a factor of 30 (Anon. 2007a), and emissions of both nutrients approached the initial levels recorded in the 1960s (Oguz et al. 2008). The decrease of nutrient loads, accompanied by the reduction of eutrophication and associated processes (e.g., algal blooms and water hypoxia), resulted in encouraging changes in the state of pelagic and benthic communities at least in the northwestern part of the Black Sea, which was most impacted by pollution. Shelf areas affected by oxygen depletion became reduced and less impacted than in the 1980s and early 1990s; in addition, formerly devastated areas have began to be recolonised by benthic organisms, with a trend towards gradual increase in their diversity (Anon. 2007a).

The predominance of alien *M. leidyi* among zooplankton species was substantially reduced since its predator *Beroe ovata* (another Ctenophore originated from the Mediterranean Sea and the northeastern Atlantic) was introduced via ballast waters in 1997 (Shiganova et al. 2008). During the subsequent period (1998-2005), signs of recovery of the indigenous zooplankton started to appear including the apparent growth in abundance of species representing a forage resource for schooling pelagic fishes consumed by the cetaceans. The restraining influence of *B. ovata* invasion on *M. leidyi* looks very likely, although other consequences of this introduction are still vague. A total of 48 new aquatic and semi-aquatic alien species (i.e., over 22% of all aliens recorded in the Black Sea marine and coastal habitats) were detected in a single decade, between 1996 and 2005 (Anon. 2007a).

Ship ballast waters were identified as the primary vector (30%) of the introductions (Black Sea Commission 2009). “The introduction of so many exotic species has meant that even if the chemical environment of the sea is restored to its 1960s status, the ecology of the sea would not return to its former state" (Anon. 2007a).

Chemical (other than nutrient) and microbiological constituents of marine pollution still represent a major threat in the Black Sea, although the microbiological aspect of pollution was identified as a primarily national (rather than a transboundary) problem which was not assessed properly yet (Black Sea Commission 2009). Very high levels of pesticides (DDTs and HCHs) were recorded in bottom sediments sampled between 1995 and 2005 in selected sites in all Black Sea countries (Korshenko & Melnikov 2008). In addition, high concentrations of trace metals (Cd, Cu, Pb, Zn, As, Cr and Ni) were found in the sediments sampled in 1995-2007 in Ukraine, Russia, Georgia and Romania (Korshenko et al. 2008). Illegal dumping/discharge of chemicals (e.g., agrochemicals) was recognised as a particular transboundary problem (Anon. 2007a). No information is available regarding any ecotoxicological study of Black Sea cetaceans sampled after 1999.

Oil pollution continues to expand across the entire Black Sea and specifically along shipping lanes due to a huge increase in oil transportation. A total of 1,227 oil spills were recorded during 2000-2004, and the mean concentrations of petroleum hydrocarbons generally increased (0.05-0.28 mg/l) in water samples collected in different Black Sea areas (Korshenko 2008). Remote sensing data, obtained from European satellites by the EC Joint Research Centre within the MIDIV-project (http://serac.jrc.it/midiv/maps/), confirm that the majority of oil spills occur along major shipping routes, showing the principal cause of concern resides in vessels rather than in land-based installations (Anon. 2007a). Most oil spills in the Black Sea are not the result of accidents, but occur due to the illicit practice of discharging oil-contaminated ballast waters, particularly from oil tankers before their arrival to oil terminals for loading. However, sea accidents contribute to the problem as well. For instance, on November 11, 2007, a heavy storm led to a dozen shipwrecks in the northeastern Black Sea, and a total of 1,200 to 2,000 tons of fuel oil spilled into water in the Kerch Strait (Birkun & Krivokhizhin 2008). Benthic and coastal habitats were heavily damaged, and local bottlenose dolphins and harbour porpoises may remain for indefinably long period affected by chronic oil pollution.

The Black Sea is subjected to enormous pollution by solid waste (Black Sea Commission 2007). Floating marine litter, including plastics and abandoned or lost fishing nets, may represent an important threat to cetaceans through ingestion of inedible objects and entanglement (ghost fishing). In addition, it was revealed recently that the risk of harbour porpoise bycatch in conventional turbot nets almost doubles when the net also contains long-sunk plastic litter encrusted with benthic invertebrates (Birkun 2009). It can be speculated that plastic debris sunken in the shelf area may serve as an artificial substrate for the settlement of benthic and demersal organisms, thus creating "plastic litter biocenoses" which include prey species attracting porpoises near the nets and making them more susceptible to entanglement.

During the last decade, three cetacean mass mortality events occurred in the Black Sea, accompanied by live-strandings of common dolphins, harbour porpoises and, to a lesser extent, bottlenose dolphins. The first event (2003) was recorded in the northern Black Sea (Krivokhizhin et al. 2008), the second (2006) in the northern, western and southeastern areas (Radu et al. 2006, Krivokhizhin et al. 2008), and the third (2009) in the north, west, southwest and southeast including Bulgarian, Georgian, Turkish and Ukrainian waters (Tonay et al. 2010; Birkun & Krivokhizhin, unpubl. data; pers. comms. by Gradimir Gradev, Achil Guchmanidze, Ramaz Mikeladze & Konstantin Mikhailov). The wide geography of strandings is indicative of the regional scope of the two latter events. Clinical symptoms observed in live-stranded animals were similar to those reported in 1994 during the epizootic of morbilliviral disease in common dolphins (Birkun et al. 1999). Widespread latent persistence of morbillivirus antigens has been confirmed by serological examination of harbour porpoises incidentally caught far from each other in Ukraine, Bulgaria and Georgia (Müller et al. 2002).

• 6.4. Anthropogenic noise

Effects of noise on cetaceans in the ACCOBAMS area were reviewed for the Mediterranean by Roussel (2002), and were included in a more general discussion on disturbance to cetaceans in the Black Sea by Birkun (2002d).

Since 2002, substantive knowledge was gained on the detrimental effects on cetaceans of sound introduced into the sea by human activities, including in the region concerned by the present document. Amongst many, Hildebrand (2005) reviewed the subject and presented mounting evidence of pressures exerted on cetaceans by anthropogenic sound, including mortality (particularly in beaked whales) caused by high-intensity sonar and seismic surveys, and the pervasive effects of increases in background noise levels from commercial shipping, which may interfere with the mammals' ability to detect biologically relevant sounds. Nowacek et al. (2007) reviewed responses of cetaceans to man-made noise, and suggested that these fall into three main categories: behavioural, acoustic and physiological. Behavioural responses include changes in surfacing, diving and heading patterns; acoustic responses include changes in type or timing of vocalizations relative to the noise source; physiological responses involved auditory threshold shifts and stress. The potential effects of noise as a stress inducer in cetaceans were further explored by Wright et al. (2007).

Of all cetacean species, beaked whales appeared to be by far the most vulnerable to noise effects, albeit certainly not the only ones affected. For this reason, an analysis of Cuvier's beaked whale habitat in the Mediterranean, stimulated by the ACCOBAMS Scientific Committee, was performed, through spatial modelling of sighting data collected from various Mediterranean locations during the past few years (Ana Cañadas, pers. comm. – the analysis to be presented at the 4th Meeting of the Parties to ACCOBAMS in Nov. 2010). The study is expected to provide indications useful for the conduction of noise-producing activities in areas of lesser importance for the most vulnerable cetacean species.

Meanwhile, concern for the vulnerability of beaked whales to man-made noise in European waters, Mediterranean Sea included, has been influencing marine policy in the region in recent years (Dolman et al. 2010), particularly within the ACCOBAMS and ASCOBANS frameworks. Dolman et al. (2010) reviewed the efforts that European regional policies have undertaken to acknowledge and manage possible negative impacts of active sonar and how these might assist the transition from scientific research to policy implementation, including effective management and mitigation measures at a national level. However, there seems to be a significant gap between good intentions and reality, given the amount of noise-generating activities, both civilian and military, that are currently conducted in the Mediterranean without visible concern for cetacean conservation.

Two activities pose the greatest risk to cetaceans in the Mediterranean as far as noise is concerned: naval exercises and seismic surveys. Of the two, the former has received much more attention than the latter. This is surprising, giving that seismic activities are certainly no less pervasive across the region and no less potentially damaging to cetaceans than military sonar.

The first compelling evidence that military sonar is capable of causing strandings and mass mortality in cetaceans came from the Mediterranean, when Alexandros Frantzis reported on the pages of Nature (1998) the stranding of 13 Cuvier's beaked whales in a restricted coastal area of the western Peloponnese, Greece, in connection with the testing of experimental low frequency active sonar by NATO. A second incident resulting in the death of at least four Cuvier's beaked whales occurred near Almería, Spain, on 26 and 27 Jan. 2006.

Fig. 55. One of four Cuvier's beaked whales *(Ziphius cavirostris)* which were part of an atypical mass stranding near Almería, Spain, in January 2006. Photograph by Jesús Contreras/Pedro Urán Moreno.

The whales were autopsied by a veterinary team led by Prof. Antonio Fernández (Universidad de Las Palmas), who wrote (Fernández 2006):

"The epidemiological data showed an "atypical" beaked whale mass stranding involving four whales which died during the evening and/or night of the 26th of January 2006. Two animals were found alive and two were found dead. The two live animals appeared to show clear signs of "sickness" and died soon after being found. All the four animals showed a "gas and fat embolic syndrome" as a result of the pathological study.

"This syndrome, as it has been previously described in beaked whales, would be responsible for the stranding and death of these animals. When whales with this syndrome strand alive, they develop a more severe cardiovascular clinical-pathological picture and die shortly afterwards.

"The pathological findings in the Almería mass stranding is very similar to previous referenced in "atypical" beaked whale mass strandings associated spatially and temporally to military naval exercises (Bahamas, 2000; Canary Islands, 2002, 2004). In all of these cases mid- frequency active sonar was used before or during the time of strandings. The whales involved were mainly of the Ziphiidae family.

"Based on current scientific knowledge, and the pathological findings in this study, the most likely primary cause of this type of beaked whale mass stranding event is anthropogenic acoustic activities, most probably anti-submarine active mid-frequency sonar used during the military naval exercises."

At the time, naval officials approached by the ACCOBAMS Secretariat denied any involvement, however clear information about the occurrence of military exercises in the area at the time of the incident proved impossible to obtain. Full disclosure surfaced in 2007, somewhat hidden on pages 148-149 of a 528 page-long draft Environmental Impact Statement /Overseas Environmental Impact Statement issued by the U.S. Navy (Hawaii Range Complex), where it is stated that "from January 25-26, 2006, Standing North Atlantic Treaty Organization (NATO) Response Force Maritime

Group Two (five of seven ships including one U.S. ship under NATO Operational Control) had conducted active sonar training against a Spanish submarine within 50 nm of the stranding site."

Oil exploration in the Mediterranean Sea has received a very strong impetus in recent years, particularly in the central and eastern portions of the basin. However, detailed, preventive information on the occurrence, whereabouts and technical details of seismic surveys conducted in the region is proving very difficult to obtain. Single nations may choose to provide such information (e.g., Ministero dello Sviluppo Economico 2009, where a kmz file can be downloaded from, with maps of the surveys), but a regionally comprehensive picture of the exploration activities, to be overlaid to known cetacean critical habitat, is not known to be available. In spite of the laudable, precautionary (e.g., Gillespie 2007) intents of the Parties to ACCOBAMS, as stated in Resolution 3.10 of 2007 ("Guidelines to address the impact of anthropogenic noise on marine mammals in the ACCOBAMS area"), no significant progress was apparent to address the problem since MoP3, nor was there a systematic attempt at coordinating industrial activities with conservation concerns. For instance: no Environmental Impact Assessments (EIAs) for marine-based activities including considerations on the effects of underwater noise to cetaceans were ever brought to the attention of the Scientific Committee (paragraph 1, d); little impetus was noted in research sponsored by most Parties to detect and localize beaked whales by passive methods (par. 2); no special effort by the Parties was seen to encourage the development and application of quieter and environmentally safer acoustic techniques (par. 4), in spite of the strong and growing evidence that innovative technology to perform exploratory seismic surveys that are less impacting on cetaceans is available (Weilgart et al. 2010); with only one exception (the deployment of the Galsi pipeline between Algeria and Italy), no information was provided by Parties to the Secretariat on "current and reasonably foreseeable noise-producing activities occurring under their jurisdiction within the ACCOBAMS area", despite a massive rise of offshore oil & gas exploration activities in several locations within the Mediterranean basin (par.

10); no information was brought to the Scientific Committee about mitigation and monitoring measures implemented by the Parties concerning noise producing activities.

Resolution 3.10 also urged Parties and the management authorities of marine protected areas in the ACCOBAMS area to include consideration of high-power noise sources in their management plans (par. 5), urged Parties and the management authorities of marine protected areas in the ACCOBAMS area to work with the International Maritime Organization (IMO) in order to minimize exposure of cetaceans in these areas (par. 6), and encouraged Parties that are also Parties to the SPA & Biodiversity Protocol to the Barcelona Convention to adopt the ocean noise management measures recommended in Resolution 3.10 when implementing their obligations under the Protocol to adopt protection and management measures in SPAMIs (Specially Protected Areas of Mediterranean Importance)(par. 7). The concept of spatio-temporal management of noise through the use of Marine Protected Areas (MPAs) was further developed by Agardy et al. (2007) and Dolman (2007).

Wide areas of the Black and Azov Seas shelves are currently subjected to growing gas and oil exploration and extraction in all six riparian countries (Anon. 2007a, Black Sea Commission 2009). These activities are known to disturb cetaceans during different stages of the technological chain, starting with geological/geophysical reconnaissance of deposits by means of seismic surveys and trial boring, and ending with transportation of extracted gas and oil by bottom pipelines. Drilling and seismic exploration is widely spread and overlaps with known cetacean critical habitats in the northwestern (Bulgaria, Romania and Ukraine), northeastern (Russia and Ukraine) and southeastern (Georgia and Turkey) parts of the basin. So far the impact of gas and oil industry on Black Sea cetaceans was not studied at all, and no specific conservation and management measures were implemented (Black Sea Commission 2010).

• 6.5. *Direct killing and live captures*

Cetacean direct killings (i.e., as opposed to accidental killings in fisheries or other human activities) and live captures were reviewed for the Mediterranean by Notarbartolo di Sciara and Bearzi (2002) and for the Black Sea by Birkun (2002a). Already in 2002 the subtraction of individual cetaceans from wild populations through deliberate captures had become increasingly rare compared to previous decades, when the act of killing a cetacean, whenever possible, was commonplace and raised no ethical qualms (e.g., Bearzi et al. 2004). Bearzi et al. (2010b), reporting on a survey conducted amongst bystanders at a recent mass stranding of live sperm whales in Italy, concluded that attitudes towards suffering cetaceans—today strikingly revolving around sadness, compassion and a sense of loss—have changed dramatically over time, with a steep turnaround in the 1970-80s from an era in which any whale or dolphin which would come within reach of humans, either on a beach or near a vessel, was likely to be attacked and killed.

Whereas today the deliberate killing of cetaceans in the Mediterranean has become an increasingly rare occurrence, thereby failing to pose a conservation problem to the affected populations, some concern is raised by a new trend of capturing dolphins for display in captive facilities, as exemplified by the permission granted in 2006 by the Turkish Ministry of Agriculture of capturing 30 common bottlenose dolphins from population units which were proposed for inscription as Vulnerable in IUCN's Red List, and without an accurate, independent non-detriment assessment on the possible conservation consequences of such capture (Ke?apli Didrickson 2009). In the case of the Turkish permit, like in many other instances around the world, a favourable political attitude was facilitated by the misconception that captive dolphins might be successfully used in a therapeutic context, particularly involving needing children, although it has been compellingly argued that no scientific evidence exists that dolphin-assisted therapy is more effective than traditional or other adjunct therapies (Smith 2003). At least four bottlenose dolphins live-captured in Turkey in 2006-2007 were taken from the Marmara Sea (Black Sea Commission 2010) and, thus, could belong to either the Black Sea or Mediterranean populations which are treated in a different ways by CITES (with more strict regulations – 0 quota for export – in the case of Black Sea bottlenose dolphins). However, the population status of those animals was not ascertained by genetic examination and this oversight, in principle, could facilitate shifting them abroad to any country.

In 2007, the Ministry of Environment and Natural Resources of Ukraine granted several permits for the removal of live stranded Black Sea bottlenose dolphins from the wild for rescue and rehabilitation purposes (Black Sea Commission 2010). As a result, at least three but, probably, >20 healthy individuals of this subspecies were captured in Ukraine with no return into the natural environment.

Furthermore, information was received (e.g., Diasamidze 2010) that a new dolphinarium in Batumi, Georgia, held in captivity 20 bottlenose dolphins, allegedly captured in the Georgian Black Sea in May-June 2009. Based on the above source, six animals have already died, and two dolphins were born in captivity during last year; thus at present (at the end of August 2010) there should be 16 bottlenose dolphins in the facilities. Some of these (at least four or five) could be viewed on a video that supports the publication (http://netgazeti.ge/GE/18/law/2127/). Both the legal and health status of these dolphins are unclear. In August 2010, the Batumi dolphinarium was still unopened to the public.

• 6.6. *Climate and ecosystem change*

The potential impacts of climate change on marine mammals include modifications in prey availability affecting distribution, abundance and migration patterns, community structure, and susceptibility to disease and contaminants; ultimately, these may impact on the reproductive success and survival of marine mammals and, hence, have consequences for populations (Learmonth et al. 2006). Marine mammal populations with a restricted geographical distribution, with limited opportunity for range expansion in response to climate change, may be particularly vulnerable to the effects of climate change, with obvious conservation implications (Learmonth et al. 2006). One possible response of cetacean species to increases in water temperature is a change of distribution. MacLeod (2009) provides a framework for assessing which cetacean ranges are likely to change as a result of increases in water temperature and whether they will expand, shift poleward or contract based on their current distributions. Based on this framework, MacLeod (2009) predicted that the ranges of 88% of cetaceans may be affected by changes in water temperature resulting from global climate change. For 47% of species, these changes are anticipated to have unfavourable implications for their conservation, and for 21% the changes may put at least one geographically isolated population of the species at high risk of extinction.

The special case of the potential effect of climate change on cetaceans in the Mediterranean was addressed by Gambaiani et al. (2009). Changes in bio-chemical and physical seawater properties resulting from global warming – including ocean acidification deriving from increasing levels of atmospheric CO^2 dissolving in sea water – are likely to alter Mediterranean marine biodiversity and productivity, trigger trophic web mismatches and encourage diseases, toxic algal bloom and propagation of thermophilic species. Gambaiani et al. (2009) provided as an example of ecosystem vulnerability the case of the small pelagic euphausiid, *Meganyctiphanes norvegica,* the main known food supply of the region's fin whales and a number of other oceanic consumers. Situated at the southern limit of its ecological tolerance, this species might be dramatically affected by climate change-induced alteration of ocean circulation. As a result of the range of effects – predicted and observed – deriving from climate change to Mediterranean cetaceans, these populations may be considered potentially at particular risk from changes in range in response to increasing water temperatures. However, more time and further research are required to assess whether these predictions are, indeed, correct (MacLeod 2009).

The influence of the global climate change on Black Sea cetaceans has not been addressed yet, while its possible impacts on some components of the Black Sea ecosystem were considered by Oguz (2009). In particular, it was mentioned that the populations of some fish species (such as sprat and anchovy) tend to follow temperature variations, and these fishes will respond, apparently, to the warming by alteration in their productivity and distribution. In addition, it could be expected that the warming will promote further invasion of the Black Sea by thermophilic aliens including the immigration of more Mediterranean species ("Mediterraneisation of the Black Sea fauna") (Oguz 2009).

• 6.7. Conclusion: how has the situation changed during the past eight years?

Based on the available information, succinctly described at the species level (Section 5) and on the basis of the different types of threats (this section), a synopsis of threats thought to be affecting the different species regularly occurring in the ACCOBAMS area is presented in tables 17 (Mediterranean) and 18 (Black Sea). Tables 17 and 18 are based on a list of threats adapted from the Authority File for threats developed by IUCN, which was applied to assessments made in 2006 to include Mediterranean and Black Sea cetacean populations in IUCN's Red List.

Threat	fw	sw	cbw	kw	pw	rd	rtd	bd	sd	cd	hp
1. Habitat loss/degradation (human induced)											
1.1. Agriculture											
1.1.6. Marine aquaculture											?
1.3. Extraction											
1.3.1 Mining (oil & gas extraction)	?	?		?	?	?	?	?	?	?	?
1.3.2. Fisheries											
1.3.2.2. Artisanal/small-scale											?
1.3.2.3. Large-scale/industrial											?
1.4. Infrastructure development											
1.4.1. Industry											?
1.4.2. Human settlement											?
1.4.3. Tourism/recreation											?
1.4.5. Transport – water											
1.5. Invasive alien species (directly impacting habitat)											
1.6. Change in native species dynamics (directly impacting habitat)											
2. Invasive alien species (directly affecting the species)											
2.1. Competitors											
2.2. Predators											
2.4. Pathogens/parasites											
3. Harvesting [hunting/gathering]											
3.1. Food											
3.1.1. Subsistence use/local trade											
3.1.2. Sub-national/national trade											
3.1.3. Regional/international trade											

Threat	fw	sw	cbw	kw	pw	rd	rtd	bd	sd	cd	hp
3.4. Materials											
3.4.1. Subsistence use/local trade											
3.4.2. Sub-national/national trade											
3.4.3. Regional/international trade											
3.5. Cultural/scientific/leisure activities											
3.5.1. Subsistence use/local trade											
3.5.2. Sub-national/national trade											
3.5.3. Regional/international trade											
4. Accidental mortality											
4.1. Bycatch											
4.1.1. Fisheries-related											
4.1.1.1. Hooking											
4.1.1.2. Netting											
4.1.1.4. Dynamite			?					?		?	?
4.2. Collision											
4.2.2. Vehicle collision			?								
4.2.3. Other											
4.2.4. Unknown											
5. Persecution											
5.1. Pest control											?
5.2. Other											
5.3. Unknown											
6. Pollution (affecting habitat and/or species)											
6.1. Atmospheric pollution											
6.1.1. Global warming/oceanic warming	?	?	?	?	?	?	?	?	?	?	?
6.1.2. Acid precipitation											
6.1.3. Ozone hole effects											
6.1.4. Smog											
6.1.5. Other: ocean acidification	?	?	?	?	?	?	?	?	?	?	?
6.3. Water pollution											
6.3.1. Agricultural											
6.3.2. Domestic											
6.3.3. Commercial/Industrial											
6.3.4. Other non-agricultural											
6.3.5. Thermal pollution											
6.3.6. Oil slicks											

Threat	fw	sw	cbw	kw	pw	rd	rtd	bd	sd	cd	hp
6.3.7. Sediment											
6.3.8. Sewage											
6.3.9. Solid waste				?	?		?	?	?	?	?
6.3.10. Noise pollution						?	?	?	?	?	?
7. Natural disasters											
7.3. Temperature extremes											
7.5. Volcanoes											
8. Changes in native species dynamics											
8.1. Competitors											
8.2. Predators											
8.3. Prey/food base		?	?		?	?	?		?		?
8.5. Pathogens/parasites	?	?	?	?	?	?	?			?	?
8.6. Mutualisms											
9. Intrinsic Factors											
9.1. Limited dispersal											
9.2. Poor recruitment/reproduction/regeneration											
9.3. High juvenile mortality											
9.4. Inbreeding											
9.5. Low densities											
9.6. Skewed sex ratios											
9.7. Slow growth rates											
9.8. Population fluctuations											
9.9. Restricted range											
10. Human disturbance											
10.1. Recreation/tourism			?				?			?	?
10.2. Research											
10.3. War/civil unrest											
11. Other											
12. Unknown											

Table 17. Known and presumed threats to cetacean populations regularly occurring in the Mediterranean. Species codes: **fw** (fin whale), **sw** (sperm whale), **cbw** (Cuvier's beaked whale), **kw** (killer whale), **pw** (long-finned pilot whale), **rd** (Risso's dolphin), **rtd** (rough-toothed dolphin), **bd** (common bottlenose dolphin), **sd** (striped dolphin), **cd** (short-beaked common dolphin), **hp** (harbour porpoise). Cell colour codes: dark colour: threat known or presumed to be of primary importance; light colour: threat known or presumed to be of secondary importance; white: threat unlikely to be significant; "?": insufficient data, need for targeted research. Threat numeration was adopted from IUCN Authority file (not applicable threats were deleted).

Threat	bd	cd	hp
1. Habitat loss/degradation (human induced)			
1.1. Agriculture			
1.1.6. Marine aquaculture			
1.1.7. Freshwater aquaculture			
1.3. Extraction			
1.3.1. Mining (sand, gas & oil)	?	?	?
1.3.2. Fisheries			
1.3.2.1. Subsistence			
1.3.2.2. Artisanal/small-scale			
1.3.2.3. Large-scale/industrial			
1.4. Infrastructure development			
1.4.1. Industry (including gas pipelines)	?	?	?
1.4.2. Human settlement	?		?
1.4.3. Tourism/recreation	?		?
1.4.5. Transport – water	?	?	?
1.5. Invasive alien species (directly impacting habitat)			
1.6. Change in native species dynamics (directly impacting habitat)	?	?	?

Threat	bd	cd	hp
2. Invasive alien species (directly affecting the species)			
2.1. Competitors			
2.2. Predators			
2.4. Pathogens/parasites			
3. Harvesting [hunting/gathering]			
3.1. Food			
3.1.1. Subsistence use/local trade			
3.1.2. Sub-national/national trade			
3.1.3. Regional/international trade			
3.4. Materials			
3.4.1. Subsistence use/local trade			
3.4.2. Sub-national/national trade			
3.4.3. Regional/international trade			
3.5. Cultural/scientific/leisure activities			
3.5.1. Subsistence use/local trade			
3.5.2. Sub-national/national trade			
3.5.3. Regional/international trade			

Threat	bd	cd	hp
4. Accidental mortality			
4.1. Bycatch			
4.1.1. Fisheries-related			
4.1.1.1. Hooking			
4.1.1.2. Netting			
4.1.1.4. Dynamite			
4.2. Collision			
4.2.2. Vehicle collision			
4.3. Other (explosion of gas platform)			
5. Persecution			
5.1. Pest control			
6. Pollution (affecting habitat and/or species)			
6.1. Atmospheric pollution			
6.1.1. Global warming/oceanic warming	?	?	?
6.1.2. Acid precipitation			
6.1.3. Ozone hole effects			
6.1.4. Smog			

Threat	bd	cd	hp
6.3. Water pollution			
6.3.1. Agricultural			
6.3.2. Domestic			
6.3.3. Commercial/Industrial			
6.3.4. Other non-agricultural (from vessels)			
6.3.5. Thermal pollution			
6.3.6. Oil slicks			
6.3.7. Sediment			
6.3.8. Sewage			
6.3.9. Solid waste			
6.3.10. Noise pollution	?	?	?
7. Natural disasters			
7.3. Temperature extremes (ice entrapment)			
7.5. Volcanoes			
8. Changes in native species dynamics			
8.1. Competitors			
8.2. Predators			

Threat		bd	cd	hp
	8.3. Prey/food base			
	8.5. Pathogens/parasites			
	8.6. Mutualisms			
9. Intrinsic Factors				
	9.1. Limited dispersal			
	9.2. Poor recruitment/reproduction/regeneration			
	9.3. High juvenile mortality			
	9.4. Inbreeding			
	9.5. Low densities			
	9.6. Skewed sex ratios			
	9.7. Slow growth rates			
	9.8. Population fluctuations			
	9.9. Restricted range			
10. Human disturbance				
	10.1. Recreation/tourism	?	?	?
	10.2. Research			
	10.3. War/civil unrest			
11. Other (unregulated release and escape from captivity)				

Table 18. Current known and presumed threats to cetacean populations regularly occurring in the Black Sea. Species codes: **bd** (common bottlenose dolphin), **cd** (short-beaked common dolphin), **hp** (harbour porpoise). Cell colour codes: dark colour: threat known or presumed to be of primary importance; light colour: threat known or presumed to be of secondary importance; white: threat unlikely to be significant; "?": insufficient data, need for targeted research. Threat numeration was adopted from IUCN Authority file (not applicable threats were deleted).

A comparison between Tables 17 and 18 (above) and Table 17.1 in Notarbartolo di Sciara et al. (2002), both based on expert opinion rather than on data (due to unavailability of solid information), reveals some intervening differences, due in part to increased knowledge, and in part to changing conditions, although most threats appear to have remained unchanged. A short species-based account follows:

• **In fin whales,** ship strikes continue to be considered a primary threat; climate effects, including potential prey depletion, are of greater concern today, and so has become anthropogenic sound; disturbance and various forms of pollution remain secondary.

• Entanglement in driftnets and ship strikes have remained the main threats to **sperm whales;** anthropogenic sound (particularly in connection with gas & oil exploration) is potential/secondary, but the illegal use of dynamite for fishing may be locally important (e.g., off Crete); disturbance and chemical pollution remain secondary, although solid waste (plastic ingestion) is potentially relevant. Disturbance (whale watching included) remains a secondary concern.

• Noise (from military sonar and possibly from seismic surveys) is confirmed as a primary threat to **Cuvier's beaked whales;** entanglement in driftnets is another primary factor, as well as possibly the illegal use of dynamite for fishing (e.g., off Crete). Pollution remains secondary, although solid waste (plastic ingestion) is potentially relevant.

• No change was evident concerning **long-finned pilot whales,** with entanglement in driftnets remaining the main threat.

• Concerning little-known **Risso's dolphins,** the threat of entanglement in driftnets was added to that from disturbance; pollution remains secondary, although solid waste (plastic ingestion) is potentially relevant.

•**Striped dolphins'** threats were largely unchanged (with pollution and entanglement in driftnets remaining high, global change uncertain and disturbance secondary); however, the threat from pathogens was noted, as morbillivirus epizootics revealed to be recurrent in the region.

• Coastal odontocetes appeared to be subjected to higher levels of threat than previously acknowledged, due in large part to coastal habitat loss and degradation affecting **common bottlenose dolphins, short-beaked common dolphins,** and **harbour porpoises.** Prey depletion remains a major threat to common dolphins (posed by industrial overfishing), and potential secondary to bottlenose dolphins and harbour porpoises (by artisanal and industrial fishing). Bycatch is a threat to all three species, but the greatest concern involves the Moroccan driftnet fishery in the Alborán Sea affecting common and striped dolphins, and the near-bottom gillnet fishery in the Black and Azov Seas affecting harbour porpoises. Bottlenose dolphins are widely persecuted throughout the Mediterranean and in some areas of the Black Sea as a result of operational interactions with artisanal fisheries, and are being live-captured for display in dolphinaria. Pollution remains a primary threat to all three species, due to the higher contamination of their coastal habitats.

• Two species that were not considered in 2002 include **killer whales** (because the 2002 analysis considered populations regular in the Mediterranean and Black Sea, not in the Atlantic) and rough-toothed dolphins (which were not considered regular species in the ACCOBAMS area at that time). Killer whales are thought to be mostly affected by persecution from fishermen and by the depletion of their main prey (bluefin tuna). **Rough-toothed dolphins** are known to become entangled in fishing gear in the Levantine Sea; a mass stranding event in Cyprus sounds suspicious, as similar phenomena may occur in vicinities of seismic explorations.

7. Conserving cetaceans in the region

• 7.1. Regulations and measures in place

7.1.1. The legal framework

Scovazzi (2002) conducted a very complete survey (which included the distribution of a questionnaire) of the existing legal framework concerning the conservation of marine mammals in the ACCOBAMS area. His analysis included: an overview of the ACCOBAMS provisions requiring implementation in the domestic legislation of the Parties; a survey of the relevant domestic legislation in some ACCOBAMS member and range states (Croatia, France, Greece, Italy, Malta, Monaco, Portugal, Slovenia, Spain, and Turkey) and the European Union; a review of the pertinent international law, including treaties having relevance for the conservation of cetaceans in the ACCOBAMS area; and guidelines on the establishment of marine specially protected areas, having relevance to cetacean conservation, in the High Seas or Exclusive Economic Zones.

Eight years after Scovazzi's report, the need is now evident for an update of the survey, first of all to include information on the domestic legislation of the many Parties which have joined the Agreement since it entered into force in 2001. A very important point made in Scovazzi (2002) is that many of the provisions of ACCOBAMS, such as the obligations to adopt measures to minimize adverse effects of human activities on the conservation status of cetacean (e.g., the carrying out of Environmental Impact Assessments, fishing activities, offshore exploration and exploitation, tourism activities), habitat protection, research and monitoring, capacity building, and responses to emergency situations, are not self-executing. In other words, they cannot be implemented and enforced as a mere consequence of a State having become a Party to ACCOBAMS, but need the enactment of specific laws and regulations or the taking of administrative action (Scovazzi 2002). This condition of course has serious implications for the implementations of the ACCOBAMS provisions, which may be well accepted by all Parties in principle, but be largely still unattended in the everyday practice. Therefore, the need for a review of the pertinent domestic law of all the ACCOBAMS Parties, with a careful evaluation of how such legislation has evolved as an effect to each country having become Party to ACCOBAMS, would seem like a most relevant aspect to investigate.

In terms of major legal changes since the Agreement came into force, the most significant event is certainly an amendment of the Agreement itself regarding the use of driftnets, which was adopted at the 3rd Meeting of Parties in October 2007. The amendment, which entered into force for all Parties on 22 March 2008, states that “no vessel will be authorized to keep on board or to use any drift nets.” In its previous (original) formulation the Agreement stated that “no vessel shall be allowed to keep on board, or use for fishing, one or more drift nets whose individual or total length is more than 2.5 kilometres”. Regrettably, ACCOBAMS and several other international, regional and European regulations notwithstanding, the use of driftnets in the Mediterranean Sea still continues to this date in several range States, Parties included, and still causes significant mortality in endangered cetacean populations.

7.1.2. “Conventional” conservation measures

In the toolbox of marine conservation, measures to manage fisheries and conserve the marine environment without resorting to the establishment of marine protected areas are often referred to with the generic term of "conventional measures" (Agardy 1997).

In the ACCOBAMS region there is a wealth of regulations concerning conventional measures, addressing many of the pressures that impact on cetacean conservation. These include most notably fisheries, maritime transportation, and a number of activities susceptible of introducing pollution (chemical, nutrient, acoustic, etc.) into the marine environment, thereby causing it to degrade and to become less hospitable for native cetacean populations.

In a comprehensive conservation plan for Mediterranean short-beaked common dolphins, which was presented to the 2nd Meeting of the ACCOBAMS Parties, Bearzi et al. (2004) recalled that "the principal management measures that will benefit common dolphins are already embedded in existing legislation and treaties", and suggested that "if all such measures, invoked by existing international, regional and national legal instruments for the management of the Mediterranean, were to be fully implemented and enforced, the decline of common dolphins would likely cease". These statements are still valid and can be extended to conservation concerns for all cetacean species in the ACCOBAMS area. Given that so many of the factors that are responsible for the decline of cetaceans in this marine region derive from human activities that are unsustainable and/or illegal, it can be concluded that honouring existing obligations with regard to the management of fisheries, pollution and other forms of habitat degradation (e.g., binding recommendations adopted by the General Fisheries Commission for the Mediterranean, the various Protocols to the Barcelona and Bucharest Conventions on pollution and conservation of biodiversity, and, as far as the European Member States are concerned, the relevant Directives and Communications from the Commission) represents the single most important action to stop the decline of ACCOBAMS cetaceans and facilitate their recovery.

In the Conservation Plan for Black Sea Cetaceans (CPBSC, Birkun et al. 2006), approved by the 3rd Meeting of Parties to ACCOBAMS, some of the proposed actions (n. 3 and 4) were intended to improve the legal regulation of fisheries and nature conservation of the Black Sea at the regional and national levels. The current legislation regarding management, use and protection of marine living resources is not adequately developed and needs to be strengthened. In particular, overfishing and IUU fishing are common region-wide problems causing extensive and unsustainable mortality of cetaceans in fishing gear and the depletion of cetacean prey. Numerous national laws and related instruments should be revised in conformity with the international obligations of the Black Sea countries. Some principal CPBSC components were incorporated for further implementation into the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (Black Sea SAP), adopted in 2009 by the Ministerial Meeting - Diplomatic Conference of the Contracting Parties to the Bucharest Convention. According to the Black Sea SAP's Management Target 1, the adoption and implementation of the Regional Agreement for Fisheries and Conservation of Living Resources of the Black Sea is a matter of high priority, although the end of negotiation process is uncertain because of the lack of consensus between the riparian countries (Black Sea Commission 2010).

7.1.3. Marine protected areas[7]

The ACCOBAMS marine protected areas work began in 2002 with the recommendation, accepted by the Parties, to consider four pilot marine protected areas (MPAs). One of these, the Lošinj Dolphin Reserve, has since been the object of legal attention by Croatia (more information on this below), but the two in Greece (Kalamos and Southwest Crete) and one in Ukraine (Cape Sarych to Cape Khersones) have yet to receive protection. In November 2006, MPA work related to cetaceans shifted into high gear with a half-day workshop held in Monaco (Hoyt et al. 2006). This laid the groundwork for cetacean habitat protection in the region as the ACCOBAMS Scientific Committee developed criteria and guidelines for setting up MPAs and formulated recommendations for 17 new MPAs, with tentative boundaries based on current research (Figure 56). In addition to the four pilot MPAs already agreed by the Parties in 2002, the new proposals included:

7 This section is an adaptation from Hoyt & Notarbartolo di Sciara 2010.

• eight proposed MPAs recommended by the ACCOBAMS Scientific Committee as part of the Mediterranean Common Dolphin Conservation Plan (Bearzi et al. 2004);

• three cetacean specially protected areas proposed by the Black Sea Commission's Round Table on Conservation of Black Sea Cetaceans, in Istanbul, in 2006 (Black Sea Commission 2007b); and

• six additional important cetacean areas recommended by the Scientific Committee based on the latest cetacean research in the region (Hoyt et al. 2006).

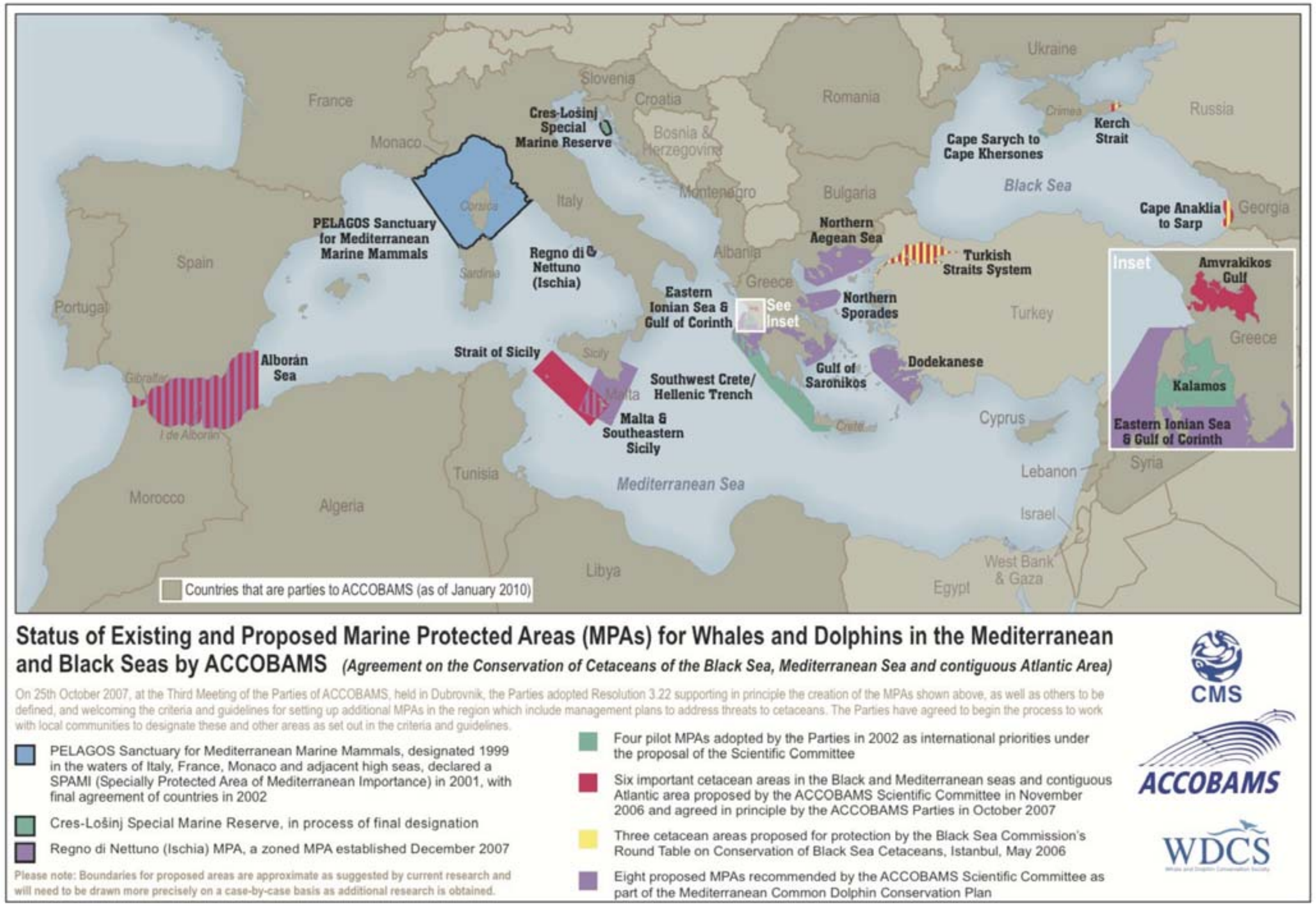


Fig 56. Areas recommended for protection by the Scientific Committee of ACCOBAMS in 2006 (Hoyt et al. 2006).

In October 2007, at their 3rd Meeting held in Dubrovnik, the ACCOBAMS Parties adopted Resolution 3.22 supporting in principle the creation of all 17 MPAs as recommended by the Scientific Committee, as well as others to be defined, and welcoming the criteria and guidelines (Notarbartolo di Sciara 2007a) for setting up additional MPAs in the region which include management plans to address threats to cetaceans. The Parties agreed to begin the process to work with local communities to designate these and other areas as set out in the criteria and guidelines. To date, there has been some progress in a number of the areas, including small portions of the Alborán Sea with proposed and declared Special Areas of Conservation (SACs) within the *Natura 2000* framework, as well as maritime traffic regulations that have been introduced near Cabo de Gata and in the Strait of Gibraltar to protect cetaceans. However, only one area has been formally declared, the “Regno di Nettuno Marine Protected Area” around the island of Ischia, off Naples, Italy. This area protects habitat for mainly short-beaked common dolphins and sperm whales. Updates on these and other proposed and existing MPAs in the region are detailed in the appropriate sections below.

Regno di Nettuno MPA. The area was first proposed in 1991 as an MPA through the Italian Ministry of Environment under Law 394/91, but the boundaries were limited to the waters around the island of Ischia. A larger area was one of eight proposed MPAs recommended by ACCOBAMS Scientific Committee as part of the Mediterranean Common Dolphin Conservation Plan (Bearzi et al. 2004); this area was agreed in principle by ACCOBAMS Parties in 2007. At the same time, research in the area identified sperm whales using the canyon habitat north of Ischia and recommended that the proposed MPA be expanded to include part of this canyon. In December 2007 this larger area was approved by the Italian government with regulations following in 2008. A management plan is to be developed. The rationale for protection of the area is to protect yearround habitat of endangered short-beaked common dolphins as well as the diversity around the deep canyon incursion into the continental slope, which includes sperm whales.

Lošinj Dolphin Reserve. On 27 July 2006, the Ministry of Culture of the Republic of Croatia declared a 3-year long preventative protection of the Lošinj Dolphin Reserve, in the category of a Special Zoological Reserve. Now that the 3-year period has expired the fate of the reserve is still pending. The State Institute for Nature Protection (SINP) is waiting for the response to their proposal from the Croatian authorities. The total size of the MPA proposed is 46,297ha (of which 46,059ha on sea and 238ha on land). This would be a Regional Park according to the Croatian Law on nature protection, with a proposed level of protection equivalent to IUCN category V. SINP is also proposing zonation of the area to include a few smaller “no take” zones, bigger zones where all trawling activities are forbidden, one “go slow” zone and the rest of the MPA in which fishing activities and boat traffic would be regulated according to the existing relevant laws and regulations. SINP suggested a set of conservation measures to be implemented in the future management of the MPA based on advice from the ACCOBAMS Scientific Committee. In any case, no part of this proposal is legally binding and it remains to be seen if it will be accepted or not or if some aspects will be changed in view of local opposition from some quarters. The next steps are up to the authorities of the County of Primorsko – Goranska who must organize a process of public hearing regarding the proposal for the permanent protection, prior to its declaration. In any case, the area is still legally protected as the part of the Croatian Ecological Network, as an important site for wild species and habitats with the bottlenose dolphin as one of its conservation objectives.

Tunisian MPAs with potential dolphin habitat. Information on the presence of cetaceans and potential cetacean habitat in the areas of the Kneiss Islands, La Galite, Zembra and Zembretta (listed variously as MPAs and SPAMIs) was solicited from Mohamed Nejmeddine Bradai from the Institut National des Sciences et Technologies de la Mer (INSTM) in Tunisia. The transect study from Ben Naceur et al. (2004) covered southeastern inshore waters up to 15 nm from the coast. It showed high densities of mainly bottlenose dolphins, with the majority (57.6%) of observations located in water less than 50 m deep. A relatively large proportion of detections (30.3%) was made between 50 and 100 m deep. Striped dolphins were further offshore. A second transect study (2005 but not yet published) covered the northern offshore waters near the protected Galite Archipelago. Bradai summarized the study noting that four cetacean species were found near the archipelago (mainly bottlenose dolphins, but sporadically also short-beaked common, striped, and Risso’s dolphins). Zembra and Zembretta offered the presence of bottlenose dolphins only, with Zembra covering more area than tiny Zembretta.

Strait of Sicily. The Strait of Sicily was one of 17 MPAs proposed and accepted in principle by the Parties in Dubrovnik in 2007. With its shelf areas connecting the eastern and western sub-basins of the Mediterranean, this area has strong potential ecological importance. Compared to most of the areas proposed, less was known about this area as research has been comparatively minimal. A strong component of the arguments for protection here is the predictable presence of fin whales, striped, common and bottlenose dolphins among other cetaceans in an area of high primary productivity and zooplankton concentration (Greenpeace International 2009).

Greece. Important concentrations of cetaceans (in particular common dolphins, bottlenose dolphins and sperm whales) occur in many portions of the Greek territorial waters and adjacent sea, and work is in progress by a number of regional NGOs to precisely identify such areas in order to consider them for protection. These include the Inner Ionian Sea, the Thracian Sea, the Hellenic Trench, the Eastern Gulf of Corinth, the Amvrakikòs Gulf, and parts of the Aegean Sea (Notarbartolo di Sciara & Bearzi 2010).

Spain. The NGO *Alnitak* has continued its efforts to work on MPAs, including SACs, Oceanic Areas and SPAMIs in the western Mediterranean, all of which include well documented cetacean habitat. As noted previously, due to *Alnitak* work, a Special Area for Conservation (SAC) was established off Murcia (Medio Marino de Murcia) and additional MPAs have been proposed, including SACs in the Strait of Gibraltar, off southern Almería, and around the Island of Alborán; as well as an Oceanic Area in the far eastern Alborán Sea. Work towards the creation of the SPAMI has also continued, in terms of working with stakeholders, but entirely on the Spanish side. Efforts must be made to engage Morocco, Algeria and Gibraltar (UK) which also border the SPAMI, so that they are included.

France. France has created no new MPAs in the Mediterranean with cetacean habitat, but in July 2009 President Sarkozy announced that the French government intended to fulfil a mandate to protect 10% of its waters in MPAs by 2012 and 20% by 2020. This promise includes all French waters worldwide (11 million km^2). A substantial percentage, as much as half according to French promises, would be highly protected.

Pelagos Sanctuary for Mediterranean Marine Mammals. The Pelagos Sanctuary was not one of the proposed MPAs identified by the ACCOBAMS SC, given that it had already been established. However, because of its large size, its high profile as a transboundary and the world's first high seas MPA, its strategic location in the Mediterranean in an area of high biodiversity and its significant coverage of the habitat of most Mediterranean species (Notarbartolo di Sciara et al. 2008), its effectiveness in terms of conserving cetacean habitat, reducing threats to cetaceans and improving the overall conservation prospects is central to the goals of ACCOBAMS. Having been adopted as a Specially Protected Area of Mediterranean Importance (SPAMI) by the Parties to the Barcelona Convention in 2001, the Sanctuary's tenets apply to most Mediterranean riparian countries beyond the three original signatories of the Agreement, thereby extending *de facto* protection to the Mediterranean High Seas. However, in the 10 years since its creation, Pelagos so far has failed to fulfil its main goal of significantly improving the conservation status of the area's cetacean populations, which are threatened by intense human pressures (e.g., fisheries, maritime traffic including offshore motorboat competitions, military exercises, climate change, coastal construction, downstream effects of land use, and whale watching). Effectively mitigating those threats would require an Ecosystem-based Management (EBM) approach, which takes into account the regulation of marine resource use and other human activities, control of landbased and maritime sources of pollution, integrated coastal zone/ocean management, and an adaptive management approach that would deal with rapidly changing patterns of use as well as with technological, socio-economic, political and natural change. Management should include creating a zoning scheme to optimize conservation, channelling the area's intense maritime traffic along established corridors, systematically addressing fishery impacts on cetaceans, ensuring that no high-intensity noise is produced, ensuring the orderly and respectful development of the whale watching industry, and, in general terms, establishing precise regulations to address and mitigate impacts exerted on the local cetacean populations by pressures deriving from human activities (Notarbartolo di Sciara 2010). All these actions would require an adequately empowered management body, which is also an obligate requisite for SPAMIs, as clearly stated in the Protocol on Specially Protected Areas and Biological Diversity to the Barcelona Convention (Annex I, D.6). Unfortunately, actual management and conservation actions within Pelagos' waters are severely limited by the Sanctuary's current rather unusual governance regime. The Agreement's Contracting Parties adopt political commitment resolutions during their meetings, approximately every three years. Amongst such resolutions there was, in 2004, the adoption of a management plan which was commissioned to a consultant, and is now becoming obsolete because it was never adapted to socio-economic and ecosystem changes that have occurred since it was drafted. However, there is no proper management body of the Pelagos Sanctuary. The Parties' assumption that the Agreement Secretariat – which is devoid of sufficient powers as well as means and human resources to prevent or control activities that contrast with the aims of the protected area – should act as a surrogate management body of the Pelagos SPAMI has been a crippling misunderstanding, resulting in severely deficient management action in the area (Notarbartolo di Sciara 2010).

Mediterranean Action Plan (UNEP MAP) initiative for a High Seas SPAMI network in the Mediterranean. Since 2008, work has proceeded on an UNEP MAP effort to enable the Parties to the Barcelona Convention to establish a network of SPAMIs in Mediterranean Areas Beyond National Jurisdiction (ABNJ, also known as High-Seas). The first phase of a project funded by the European Commission was recently concluded by UNEP MAP's Regional Activity Centre for Specially Protected Areas (RAC/SPA), in which a number of *Ecologically or Biologically Significant Areas* (EBSAs), as defined by the Convention of Biological Diversity, were identified in the Mediterranean, containing 12 potential SPAMIs. The second phase (2010-11) will address the economic, social, and political aspects of SPAMI establishment and will promote field surveys co-organized with Parties and regional organizations to support the preparation of a first set of SPAMI proposals.

Many of the proposed SPAMIs – e.g., southeastern Levantine Sea, northern Levantine Sea, Thracian Sea, northeastern Ionian Sea, Strait of Sicily, areas to the southeast and to the west of the Pelagos Sanctuary, southern Balearic Sea, Alborán Sea – were considered, amongst other things, on the basis of the known existence of cetacean critical habitat in the area (Notarbartolo di Sciara & Agardy 2009). A tight coordination between this effort and that of ACCOBAMS (which was represented within the project's Steering Committee) would ensure the desirable and necessary synergy between regional conservation bodies.

The continuing existence of management shortcomings concerning the Pelagos Sanctuary is particularly difficult to understand in view of the effort of creating a network of SPAMIs in Mediterranean ABNJs currently undertaken by UNEP MAP. Such effort begs the question of how do the Parties to the Barcelona Convention envisage managing such High Seas protected areas, or whether it is conceivable to establish MPAs without providing for a solid and effective management mechanism. This, in turn, raises the further question of whether a management mechanism appropriate for MPAs in the Mediterranean ABNJ can be envisaged within the existing legislative framework, or whether there is a need for more advanced juridical creativity which will account for the likely multinational nature of such protected areas. Considering the scenario described above, the fact that Mediterranean countries have yet to seize the extraordinary opportunity for management experimenting and development, presented by the only SPAMI in the ABNJ currently existing – the Pelagos Sanctuary – is baffling. The Pelagos Sanctuary could still represent a great occasion for innovative marine conservation in the Mediterranean and elsewhere. However, without a strong political impulse to make the Agreement work, the risk of failure is ever-increasing (Notarbartolo di Sciara 2010).

Black Sea MPAs specifically dedicated to cetacean conservation. So far there are no such MPAs in the Black Sea nor in neighbouring waters, including the Azov Sea along with the Kerch Strait, and the Turkish Straits System. The development of *ad hoc* MPAs was recommended for three localities designated as "areas of special importance for Black Sea cetaceans" (Resolution 3.22 adopted in 2007 by the 3rd Meeting of the Parties to ACCOBAMS): (a) the Kerch Strait for bottlenose dolphins and harbour porpoises (the Russian Federation and Ukraine); (b) Cape Sarych to Cape Khersones for bottlenose and common dolphins and harbour porpoises (Ukraine; this area was agreed for the first time at the 1st Meeting of the ACCOBAMS Parties in 2002); and (c) Cape Anaklia to Sarp for common dolphins and harbour porpoises (Georgia). In addition, a fourth area used by all Black Sea cetacean species – the Turkish Straits System (TSS) – was defined as an "area of special importance for bottlenose dolphins". No progress was attained during three years in relation to the proposed MPAs (Black Sea Commission 2010), even as a starting point for preliminary consideration by relevant authorities. Progress on the establishment of MPAs in the Black Sea should be stimulated at the national level. Further developments seem to be realistic within the framework of specific projects supported by national authorities and local communities in cooperation with nongovernmental and intergovernmental organisations. Based on Management Target 21 of the Black Sea Strategic Action Plan (SAP), adopted in 2009 by all the riparian countries, the implementation of nationally developed management plans of protected areas should be facilitated as a matter of high priority.

Black Sea network of existing protected areas. The "Workshop on Black Sea Protected Areas Eligible for the Conservation and Monitoring of Marine Mammals" (Istanbul, December 2006; its report being annexed to Black Sea Commission 2007b) produced a list of 19 protected areas which are already established and may constitute a potential backbone for a regional network. This list includes primarily coastal biosphere and nature reserves and national parks that have within their boundaries some maritime areas (always inshore and quite narrow), known or presumed to include critical habitats of cetaceans or/and the monk seal. These "eligible" protected areas are located along the Black and Azov Seas coasts in Bulgaria (2), Georgia (1), Romania (2), Russian Federation (1), Turkey (4), and Ukraine (9). The development of this network is included as an action of primary priority in CPBSC (Action 11) and in Management Target 12 of the Black Sea SAP, and should be completed during 5-10 years (i.e., before 2020).

In 2008, the Zernov's *Phyllophora* Field Botanical Preserve (offshore area of 4025 km^2 in the middle of the northwestern Black Sea shelf) was established within the EEZ of Ukraine. Although this MPA protects primarily algae *Phyllophora* spp. and the connected community, the area contains breeding, calving and feeding habitat of all three species of Black Sea cetaceans, which occur in those waters from early spring to late autumn. A 2004 vessel-based cetacean survey in the area recorded high densities of bottlenose and common dolphins; harbour porpoises were also sighted (Krivokhizhin 2009). The Zernov's *Phyllophora* Field Preserve looks very promising for cetaceans conservation and should be recommended for inclusion in the network.

First International Conference on Marine Mammal Protected Areas (ICMMPA I, March 2009, Maui, Hawaii). The International Conference on Marine Mammal Protected Areas (ICMMPA) held on the shores of the Hawaiian Islands Humpback Whale National Marine Sanctuary and partly sponsored by ACCOBAMS, invited several ACCOBAMS SC members and experts to present ongoing work on marine mammals in the Mediterranean-Black Sea region in presentations and workshops (Reeves 2009). The conference, attended by 200 such marine mammal scientists and MPA practitioners from 40 countries, forged new relationships and networks between far flung MPAs. The conference provided significant impetus to the development of improved practices to conserve cetaceans through MPAs. The Second ICMMPA, planned for the end of 2011 in Martinique, will continue with the effort of supporting the development of MPAs for cetaceans in the ACCOBAMS area.

• 7.2. *What is most needed to conserve cetaceans in the ACCOBAMS area*

Nine years after ACCOBAMS came into force, and in anticipation of the Agreement's first ten-years anniversary, the time seems now appropriate for an assessment of accomplishments and shortcomings, and for re-directing on such basis conservation efforts so that the limited human and financial resources available are used with maximum effectiveness.

Such a comprehensive assessment should include analyses of: a) the scientific knowledge that is still needed for the implementation of conservation measures (7.2.1); b) how to improve management effectiveness in matters relating to cetacean conservation, where capacity building is most needed (7.2.2); and c) how conservation of cetaceans can become more effective through an enhancement of the awareness of wider public of the need for a greater stewardship for the marine environment (7.2.3).

7.2.1. **Filling knowledge gaps**

Although conservation and management action can and should now proceed in practice without further ado, with the support of the conspicuous scientific understanding of cetacean ecology, biology and pressures that was gained in the ACCOBAMS area during the past two decades, important knowledge gaps still exist, and striving to fill such gaps in parallel to the implementation of conservation action will significantly improve management effectiveness.

The main gaps that should be filled as soon as possible concern the population ecology of cetaceans that are regular in the Agreement area (i.e., investigating their abundance and distribution, as well as the space and time variability thereof, to identify the presence of critical habitat); an understanding of the structure of such populations (i.e., to identify population geographic boundaries and assess levels of their reproductive isolation, to facilitate the identification of units to conserve); and a geographic representation of the distribution of the various man-induced pressure factors that impact on these populations.

The following sections describe the research and monitoring activities (many of which are ongoing) that are needed to fill the gaps in relevant ecological knowledge.

- 7.2.1.1 Building an Agreement-wide stranding monitoring network

It is commonly recognised that stranded cetaceans are an extremely valuable source of scientific information, otherwise very difficult to obtain (Wilkinson & Worthy 1999). All we know about many species of cetaceans (e.g., several of the beaked whales) is limited to what was learned from strandings; therefore, every stranding event should be considered a potentially unique opportunity to learn something new: a rotting carcass on the beach can yield invaluable information on anatomy, life history, genetics, disease, parasites, predators, contaminants, and feeding ecology (Perrin & Geraci 2008).

In order to exploit to the maximum all the scientific opportunities offered by cetacean strandings, a number of conditions must be met:

a) detection networks must be established over the territory of any concerned nation, as uniformly as possible along the national coastline and coastal waters, so that the chances of missing a stranding event are minimised;
b) intervention to secure the data, study material,

and help/rescue in the case of animals stranded alive (see 7.2.2) must be assured;

c) the data and study material must be made available to the scientific community at large for the extraction of information needed for conservation; and

d) the long-term continuation of the programme must be assured.

Currently, cetacean strandings are monitored very heterogeneously by the different ACCOBAMS parties and riparian states, with some nations assuring a good (albeit incomplete) level of coverage of their coastlines, whereas in the case of many others the recording of stranding events still remains an episodic effort. This is evident in Table 19 (Carrillo-Alvarez et al. 2009): 87.7% of the stranding events composing the MEDACES database were contributed by only three countries; three other countries have contributed with only one event each, and from the list of contributing countries there are some very visible absences. Of course, not contributing to the MEDACES database does not necessarily mean that a country is not monitoring cetacean strandings along its coastline, however lack of cooperation by some countries at the regional level does not help the implementation of an Agreement-wide stranding monitoring network.

Regularly detecting and recording cetacean strandings along one nation’s coastline is a complex matter in itself, but is only the first step in an even more complex effort of investigating cetacean ecology and mortality in a particular region. A stranding monitoring network cannot be

COUNTRY	YEARS	NUMBER OF STRANDING DATA (%)
Albania	2005	2 (0.02)
Algeria	1975-2008	158 (1.93)
Bulgaria	2009	4 (0.05)
Croatia	1990-2007	191 (2.34)
France	1968-2008	1,876 (22,95)
Greece	1944-2006	1,175 (14.37)
Israel	1993-2008	147 (1.8)
Libya	2009	1 (0.01)
Monaco	1989-2008	7 (0.09)
Morocco	2008	1 (0.01)
Romania	2002-2008	375 (4.59)
Slovenia	2004-2008	4 (0.05)
Spain	1960-2009	4,116 (50.35)
Syria	2005	1 (0.01)
Tunisia	1941-2008	110 (1.35)
Turkey	2000-2002	5 (0.06)
TOTAL		**8,173**

Table 19. Stranding events contributed from Mediterranean and Black Sea countries to the MEDACES database (Carrillo-Alvarez et al. 2009).

considered complete without the implementation of a number of other successive steps.

The second step – intervention on site – is even more demanding than the first because it requires complex logistics as well as substantive human and financial resources. This obstacle has been addressed in the past through the enlistment of volunteer NGOs, often operating at their own expense. Cooperation between governmental and non-governmental bodies can be extremely fruitful in this effort and should be strongly encouraged; however, it is advisable that precise terms of reference are provided by the institutions in charge, and training/certification schemes are offered, considering the delicate legal, health and environmental aspects connected with the activity.

The third important element involves bringing the scientific potential of a stranding monitoring network to full fruition. It would be a mistake to take this passage for granted, because experience has taught that very valuable scientific information is routinely wasted due to insufficient infrastructure and capacity. ACCOBAMS so far has managed to address this aspect reasonably well, in two ways: a) by securing and centralising the stranding information through the MEDACES database (in cooperation with the RAC/SPA), and b) by stimulating and supporting the setting up of cetacean "tissue banks". These collections of tissues, mostly deriving from stranded animals but also from cetaceans that have been bycaught in fishing activities[8], are hosted by scientific organisations (such as university laboratories), where samples are gathered, prepared for long term storage, and distributed to the wider community of marine mammal

8 Cetacean stranding networks and tissue banks should be linked to research groups involved in onboard monitoring programmes and sampling of cetaceans incidentally caught in fishing gear. Systematic recording and studying of bycatches in accordance with relevant protocols (e.g., Northridge & Fortuna 2008) is a matter of high priority, particularly in the Black Sea.

researchers (Cozzi 2010). Tissue samples hold an enormous potential for scientific exploitation: sampling skin fragments from living animals by non-lethal methods, or removing tissues and organs from stranded animals, may allow extensive studies of population genetics, health and dynamics, as well as body structure and pathology. Tissues may be studied comparing materials derived from geographically separated sites, or a given organ may be investigated in a series of animals that died several years apart. Furthermore, the availability of tissues from cetaceans may greatly improve studies on viral incidence, making it possible to compare lesions and/or viral genetics in outbreaks of epidemics that occurred several years apart or simultaneously in distant locations (Cozzi 2010).

Last but not least, all the programmes involved in the exploitation of the stranding phenomena for scientific and conservation purposes must benefit from a long life expectancy. The energies and resources needed to get a good stranding monitoring mechanism off the ground are considerable, and it would be very wasteful to discontinue such programme – for instance, for lack of funding continuity – after two or three years of activity. As mentioned before, stranding monitoring can greatly benefit from the involvement of volunteer NGOs, and such involvement will at the same time abate the costs of the programme and increase its quality, because motivated volunteers normally do a better job than salaried personnel acting solely on a contractual basis. However, stranding monitoring is ultimately an institutional responsibility, and for best results full government engagement in its continued operation in the long term cannot be avoided.

- 7.2.1.2 Surveys to determine and monitor population sizes and to identify cetacean critical habitats

Knowledge of the abundance and distribution of any cetacean population is of immense value when addressing conservation problems. For example, information about the size of a population in a given time allows the detection of a trend if the same measurement is taken successively with sufficient accuracy and precision, and if the trend is significantly negative conservation action can be implemented. Population size is also essential to assess whether a pressure factor has an impact. For instance, knowing what percentage of a population is subject to mortality caused by a particular human activity (e.g., fishing with gillnets, or collisions with ships) will allow assessing whether mitigation measures must be adopted to prevent that population from becoming extinct; obviously, such assessments can be made only if population size is known. Similarly, precise information about the existence of a species' critical habitat in a given location of the ACCOBAMS area will allow the *in situ* regulation of risky human activities, e.g. eventually providing the impetus for the establishment of an MPA.

Unfortunately, such knowledge is still largely missing from the ACCOBAMS area. Although a number of localised studies and research campaigns have been conducted over the years in many locations of the region, in good part through the initiative of research groups and NGOs, but lately also through a most welcome awakening of governmental interest (see below), what is still lacking is a synoptic overview of cetacean population densities and distribution throughout the entire Agreement area. At its 2nd Meeting in 2003, the Scientific Committee drew the attention of the ACCOBAMS Parties to the "fundamental importance of obtaining baseline population estimates and distributional information of cetaceans within the area as soon as possible". The Committee stressed that without such information (and a suitable monitoring programme) it will be impossible to *inter alia* determine whether ACCOBAMS is meeting its conservation objectives. The great importance of such information in the assessment of risk, the determination of appropriate mitigation measures and the associated determination of priority actions, has been highlighted in many meetings of the Scientific Committee, including past and recent discussions on bycatches, MPAs, fin whales, ship strikes, the conservation plans for Mediterranean common dolphins, Mediterranean bottlenose dolphins and Black Sea cetaceans. However, a synoptic, region-wide survey has not been performed yet: while the fundamental scientific work is completed, the primary limitations to the survey implementation now relate to questions of funding, logistics, and administration. More localised survey campaigns conducted in the ACCOBAMS area in recent years are described in Table 20 and in Figure 57. In the construction of Table 20 we have strived to collect the recent (to a large extent within the past decade), most relevant published papers providing quantitative data on distribution and abundance of cetaceans in the region. We have also included information about work which is still in progress, whenever this work is of special relevance to the creation of an overall picture (e.g., in the case of extensive aerial surveys funded by the Italian government in recent months). We apologise if we unintentionally missed important sources, and in this case we will be grateful for being informed, so that these can be included in future similar reviews and on the ACCOBAMS website.

The information on areas important for cetaceans in the ACCOBAMS area is still rather heterogeneous and in some places rather sketchy. The western Mediterranean and northern Black Sea are relatively dense of effort, whereas the eastern Mediterranean and southern, western and eastern Black Sea still contain large areas that are little or no explored, as clearly apparent from the mapping representation on Google Earth (Fig. 57 to 59).

All the data described in the following Tables and Figures are certainly useful to provide an idea, partly quantitative, of the extent of presence and distribution of cetaceans in the ACCOBAMS area, particularly as far as the western Mediterranean is concerned. This, however, cannot be considered an adequate substitute for a synoptic survey, simultaneously conducted over the whole region with uniformity of methods. A motley collection of separate, geographically circumscribed, seasonally heterogeneous studies may provide excellent information on the local situation, however these studies cannot be merged together to generate an overall regional picture. This is because the different times and seasons in which the campaigns were conducted (thereby not accounting for seasonal and/or long-range movements of the animals), and the different methods and calibrations that were used in the collection of the data, could cause such synthesis to be significantly biased.

N	Area	Species observed	Notes	References
1	southwestern Mediterranean from Alborán Sea to Tunisia	*D. delphis* *G. griseus* *G. melas* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*	One of the areas with highest sperm whale densities in the Mediterranean. Whales feed and breed here. Considering that there is some genetic exchange between Mediterranean and Atlantic sperm whales, the Alborán Sea can be considered a migration corridor between the two regions.	Boisseau et al. 2010
2	northern portion of Sea of Alborán and Gulf of Vera	*D. delphis* *G. griseus* *G. melas* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	Paper describes mostly short-beaked common dolphins, however this and other studies clearly emphasize importance of area for high densities of a number of odontocete species, which feed and breed there year-round. Cañadas and coll. have published during the past decade or so a large number of papers detailing the importance of the N. Alborán Sea for a number of other odontocete species.	Cañadas & Hammond 2008
3	eastern Alborán Sea	*D. delphis* *G. griseus* *G. melas* *S. coeruleoalba* *Z. cavirostris*	High density area for species mentioned. Breeding and feeding known to occur in the area for all of them. In the area covered by cruise a very large number of sightings were made (in 45 hours of effort: 67 Cuvier's beaked whales, 168 long-finned pilot whales, 89 Risso's dolphins, 304 short-beaked common dolphins, 870 striped dolphins, plus a number of mixed-species groups and unidentified cetaceans).	Anonymous 2010
4	western Alborán Sea	*D. delphis* *G. griseus* *G. melas* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	High density area for species mentioned. Breeding and feeding known to occur in the area for all of them. In the area covered by cruise a very large number of sightings were made (in 60 hours of effort: 56 Cuvier's beaked whales, 71 long-finned pilot whales, 38 Risso's dolphins, 222 short-beaked common dolphins, 550 striped dolphins, plus a number of mixed-species groups and unidentified cetaceans).	Anonymous 2010
5	Catalan and Balearic Seas	*T. truncatus*	Area contains critical habitat of the species, which feeds and breeds there. "The results ... strongly indicate that the islands contain critical habitats required for the conservation of the species".	Forcada et al. 2004
6	Balearic Sea	*B. physalus* *D. delphis* *G. griseus* *G. melas* *P. macrocephalus* *S. coeruleoalba* *T. truncatus* unid. beaked whale	High density area for species mentioned. Breeding and feeding known to occur in the area for at least all odontocetes.	Rendell & Cañadas 2005
7	Coastal waters of eastern Spain from Valencia to the Gulf of Vera	*G. griseus* *S. coeruleoalba* *T. truncatus*	High density area for species mentioned. Population estimates performed with aerial and vessel surveys demonstrated the high values of the study area for striped dolphins (mean abund. 15,778), bottlenose dolphins (1,333) and Risso's dolphins (493).	Gòmez de Segura et al. 2006
8	northern portion of Sea of Alborán and Gulf of Vera	*D. delphis* *G. griseus* *G. melas* *P. macrocephalus* *S. coeruleoalba* *T. truncatus* unid. beaked whales	High density area for species mentioned; breeding and feeding known to occur in the area for all of them. "The results identified areas that are important for a number of cetacean species, thus illustrating the potential for MPAs to improve cetacean conservation generally in the Alborán Sea, a region of great importance for supporting biodiversity and ecological processes in the wider Mediterranean Sea."	Cañadas et al. 2005

N	Area	Species observed	Notes	References
9	waters west of Sardinia	*B. physalus* *D. delphis* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*	"A zig-zag sampling of 584 km and 65 hours of observation were done, during which 21 groups of cetaceans were sighted. Five species were observed: the fin whale (3 sightings), the striped dolphin (10 sightings), the common dolphin (6 sightings), the bottlenose dolphin and the sperm whale (1 sighting each). High sighting frequencies were obtained for the striped dolphin in the pelagic area and for the common dolphin in the slope area, suggesting that each species favours a distinct habitat."	Gannier 1998
10	Corsican-Ligurian-Provencal basin	*B. physalus* *S. coeruleoalba*	Area established as a cetacean Sanctuary contains critical habitat for a number of cetacean species, in particular the two listed here, which are known to feed and breed there.	Panigada et al. 2008
11	western Mediterranean	*B. physalus* *D. delphis* *S. coeruleoalba*	Studies, based on line-transect absolute abundance estimates, indicate locations of distributional "hot spots" for listed species in a large portion of the W Mediterranean.	Forcada et al. 1994 Forcada et al. 1995 Forcada & Hammond 1998
12	Corsican-Ligurian-Provencal basin, outer Gulf of Lion	*B. physalus*	High density, feeding and breeding area. This area coincides with distribution detected during 1992 survey, described in Forcada et al. 1995.	Forcada et al. 1996
13	outer Gulf of Lion, between Balearic Islands and western Sardinia	*P. macrocephalus*	High density, feeding area.	Praca et al. 2009
14	Large portion of northwestern Mediterranean Sea	*B. physalus*	Satellite imagery used to gain knowledge on primary biomass over large time and space scales and to process environmental variables of significance to the problem of fin whale distribution. Fin whale distribution was obtained from survey data and expressed into sightings per unit of effort. Multiple cross-correlation coefficients were calculated between these environmental parameters and the fin whale summer distribution from 1998 to 2002. This study provides evidence that whales adapt their movements and group size directly to food availability rather than to instantaneous environmental conditions.	Littaye et al. 2004
15	Area of Pelagos Sanctuary	*B. physalus* *P. macrocephalus* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	High density of striped dolphins confirmed through aerial survey also during winter. Uncorrected striped dolphin population size was estimated to be 19,578 (%CV=19.2; 95% C.I.=12,318 – 27,039), with a density of 0.2218 individuals km^{-1} (%CV=19.23; 95% C.I.=0.1395-0.3063).	Panigada et al. 2009
16	Area of Pelagos Sanctuary	*B. physalus* *D. delphis* *G. griseus* *G. melas* *P. macrocephalus* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	High densities of most species detected. This is a report to the Italian Ministry of the environment, in Italian. Contains a summary of almost two decades of data, with spatial modelling to describe habitat for several species.	Panigada & Azzellino 2009
17	area to the west of Pelagos Sanctuary including a large part of the Sardinian Sea	*B. physalus* *G. griseus* *G. melas* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*	A series of aerial surveys funded by the Italian government was conducted in the area in summer 2010, revealing high numbers of striped dolphins and fin whales. Social groups of sperm whales (mother calf pairs) have also been observed. Pilot whales and bottlenose dolphins have also been seen, but in lower numbers.	Panigada & Lauriano, in preparation

N	Area	Species observed	Notes	References
18	northwest portion of Pelagos Sanctuary	*B. physalus* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*		Panigada & Lauriano, in preparation
19	southwest portion of Pelagos Sanctuary	*B. physalus* *G. griseus* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*		Panigada & Lauriano, in preparation
20	eastern portion of Pelagos Sanctuary	*B. physalus* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*		Panigada & Lauriano, in preparation
21	western Ligurian Sea	*B. physalus* *D. delphis* *G. griseus* *G. melas* *P. macrocephalus* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	The physical habitat of cetaceans occurring along the continental slope in the western Ligurian Sea was investigated with surveys, conducted from May to October and from 1996 to 2000. A total of 814 sightings was reported, including all the species occurring in the area. Habitat use was analysed by means of a multi-dimensional scaling analysis.	Azzellino et al. 2008
22	western Ligurian Sea	*Z. cavirostris*	247 sightings from 2000 to 2006 analysed in order to define favoured habitat.	Moulins et al. 2007
23	central Tyrrhenian Sea	*B. physalus* *S. coeruleoalba* *T. truncatus*	High densities. Detected hitherto unsuspected high densities of fin whales (but also striped and bottlenose dolphins) outside of boundaries of Pelagos Sanctuary, to the south-east.	Arcangeli et al. 2009
24	Tyrrhenian Sea off the east coast of Sardinia	*B. physalus* *D. delphis* *P. macrocephalus* *T. truncatus* *S. coeruleoalba* *Z. cavirostris*	High density area for species mentioned. A large number of sightings were made in 53 hours of effort: 27 fin whales, 24 sperm whales, 12 Cuvier's beaked whales, 4 bottlenose dolphins, 45 short-beaked common dolphins, 366 striped dolphins, plus a number of mixed-species groups and unidentified cetaceans.	Anonymous 2010
25	central and part of the southern Tyrrhenian Sea	*B. physalus* *G. griseus* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*	Regular presence. A series of line-transect aerial surveys funded by the Italian government was conducted in the area in Summer 2010, revealing high numbers of striped dolphins. Fin whales were rather abundant towards the north western border of the area. Sperm whales, Risso's dolphins and bottlenose dolphins have also been seen, but in lower numbers.	Panigada & Lauriano, in preparation
26	waters surrounding Ischia, south-eastern Tyrrhenian Sea (within the Regno di Nettuno MPA)	*D. delphis*	One of the few remaining strongholds for the species in the Mediterranean. 46 recognizable individuals have been catalogued, 19 of these re-sighted in different years, suggesting significant levels of site fidelity. Breeding activities are often observed, and calves are always present in one or more of the group sub-units. Sighted groups are relatively large (mean=65.5, SD=23.94, *n*=41, range 35–100 individuals) and often observed in association with striped dolphins, particularly during surface feeding targeting shoaling prey.	Mussi & Miragliuolo 2005.

N	Area	Species observed	Notes	References
27	waters adjacent to the Strait of Messina, to the north (Tyrrhenian Sea)	*S. coeruleoalba*	Regular presence, feeding activities. Line transect survey performed on a monthly basis for a year (June 2005 – May 2006) in a portion of the SE Tyrrhenian Sea adjacent to the Strait of Messina.	Notarbartolo di Sciara et al. 2006
28	waters adjacent to the Strait of Messina, to the south (Ionian Sea)	*P. macrocephalus* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	Regular presence, feeding activities (includes breeding in bottlenose dolphins, resident in the area). Line transect survey performed on a monthly basis for a year (June 2005 – May 2006) in a portion of the NW Ionian Sea adjacent to the Strait of Messina.	Notarbartolo di Sciara et al. 2006
29	western Ionian Sea off Sicily	*P. macrocephalus*	" ... marine biologists from the University of Pavia piggybacked a sea mammal–monitoring experiment on [an] array [of four sensors off Sicily to see whether background noise is low enough to allow for acoustic detection of neutrinos]. The ensuing log, which is still being analyzed by both biologists and physicists, indicates hundreds of sperm-whale transits per year over an area of about 1000 square kilometres".	Holden 2007
30	inner Tunisian Plateau	*T. truncatus*	Presence of critical habitat. Estimated density of common bottlenose dolphins 0.19 indiv/km^2, CV = 33%. Estimated population size 3,977.	Ben Naceur et al. 2004
31	waters adjacent to Lampedusa, Strait of Sicily	*B. physalus*	Seasonal (end of winter) high densities; foraging grounds. This study was very limited in duration and area covered, however it describes the seasonal occurrence of fin whales in the area, which had been often reported previously on the basis of local knowledge. An aerial survey in the area is being planned on the same season in 2011.	Canese et al. 2006
32	waters adjacent to the Maltese Islands	*D. delphis*	High density, breeding/calving area, foraging grounds. Preliminary study, detected important presence of species and recommends further research/conservation effort.	Vella 2005
33	Strait of Sicily	*D. delphis* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*	Vessel survey yielded low densities of various odontocetes.	Boisseau et al. 2010
34	northern Adriatic Sea	*T. truncatus*	Moderate density area; the only cetacean sighted. "report a total of 156 sightings" .... "between 1988 and 2007". "Encounter rates ... ranged between 0.42 and 1.67 groups/100 km of effort".	Bearzi et al. 2009
35	northern Adriatic Sea, Slovenian waters	*T. truncatus*	High density, breeding/calving area, foraging grounds. "A total of 120 sightings ...101 dolphins identified" between 2002 and 2008. High rate of site fidelity. Offspring present in 53.3% of groups. Annual mark-recapture estimate 0.069 dolphins/km^2.	Genov et al. 2008
36	northern Adriatic Sea, Croatian waters adjacent to the islands of Cres and Lošinj	*T. truncatus*	High density, breeding/calving area, foraging grounds. This is one amongst many papers in a longitudinal study which paved the way to the proposal of the Cres-Lošinj Special Marie Reserve for bottlenose dolphins.	Bearzi et al. 1997
37	southern Adriatic Sea	*D. delphis* *S. coeruleoalba*	Survey block described in report, however there is no information on sightings made in that block.	Boisseau et al. 2010
38	northern Adriatic Sea	*T. truncatus*	Line-transect aerial survey (31st of July to the 17th of August) funded by the Italian government, with the support of Albanian, Croatian, Montenegrin and Slovenian authorities. Data on cetacean abundance and distribution will be made available by the end of the 2010.	Fortuna & Holcer, in preparation
39	central and southern Adriatic Sea	*B. physalus* *S. coeruleoalba* *G. griseus* *T. truncatus* *Z. cavirostris*		

N	Area	Species observed	Notes	References
40	western Ionian Sea	*G. griseus* *S. coeruleoalba* *T. truncatus*	Regular presence. A series of aerial line-transect surveys funded by the Italian government was conducted in the area in Spring 2010, revealing high numbers of striped dolphins. Risso's dolphins and bottlenose dolphins have also been seen, but in lower numbers.	Panigada & Lauriano, in preparation
41	eastern Ionian Sea, Greek internal waters	*D. delphis* *T. truncatus*	Former high density area and breeding, foraging ground for short-beaked common dolphins; numbers have plummeted in recent years due to prey depletion by overfishing. Small population of common bottlenose dolphins stable in the area. This is one amongst many papers in a longitudinal study which paved the way to the declaration of a Natura 2000 site.	Bearzi et al. 2005
42	Amvrakikos Gulf, eastern Ionian Sea, Greek internal waters	*T. truncatus*	Area with highest common bottlenose dolphin density in the Mediterranean; breeding/calving area and foraging ground. Likely to be a small, isolated population.	Bearzi et al. 2008a
43	eastern Gulf of Corinth, Greece	*D. delphis* *G. griseus* *S. coeruleoalba* *T. truncatus*	Striped dolphin population likely to be small and isolated. Bottlenose dolphins shown to be able to communicate with area n. 27 (G. Bearzi pers. comm.). Common dolphins very rare, found mostly in mixed groups with striped dolphins. Since the paper was published, Risso's dolphins have disappeared from the Gulf of Corinth. Systematic surveys and photo-ID activities are ongoing in the eastern portion of the Gulf, generating quantitative data on striped and bottlenose dolphins (G. Bearzi, pers. comm.).	Frantzis & Herzing 2002
44	Hellenic Trench, eastern Mediterranean Sea	*P. macrocephalus* *Z. cavirostris*	High density, breeding/calving area, foraging grounds. Frantzis and colleagues have collected since then vast amounts of additional data during yearly cruises, which however remain unpublished. Data include information on another deep-diving species, the Cuvier's beaked whale, which also apparently has important habitat in the area.	Frantzis et al. 1999
45	Ionian Sea	*D. delphis* *P. macrocephalus* *S. bredanensis* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*	A series of visual–acoustic surveys were carried out in the Mediterranean Sea between 2003 and 2007 from RV 'Song of the Whale'. Almost 21,000 km of trackline were surveyed between the longitudes of 14°W and 36°E with an emphasis on regions with low survey effort. Survey tracklines were designed to provide even coverage probability with random start points. Ten cetacean species were positively identified (sperm whale, fin whale, Cuvier's beaked whale, false killer whale, long-finned pilot whale, Risso's dolphin, common bottlenose dolphin, rough-toothed dolphin, striped dolphin and short-beaked common dolphin). These surveys expand and clarify the known distributions of cetaceans within the Mediterranean basin. New species documented from Libyan waters include sperm whale, striped dolphin and rough-toothed dolphin. False killer whales and rough-toothed dolphins were documented for the first time off Cyprus. Live harbour porpoises were seen for the first time on Morocco's Atlantic seaboard. It is suggested that the status of rough-toothed dolphins in the Mediterranean be revised from visitor to regular species. Substantial new information on encounter rates is now available for the planning of a basin-wide systematic survey of cetaceans within the Mediterranean Sea and contiguous Atlantic waters.	Boisseau et al. 2010
46	eastern Mediterranean Sea: southern Ionian and Gulf of Sirte (Libya)	*D. delphis* *P. macrocephalus* *S. coeruleoalba* *T. truncatus*		
47	eastern Mediterranean Sea: waters south of Hellenic Arch	*D. delphis* *G. griseus* *P. macrocephalus* *S. coeruleoalba* *T. truncatus* *Z. cavirostris*		
48	eastern Mediterranean Sea: Levantine Sea	*P. crassidens* *S. bredanensis* *S. coeruleoalba* *Z. cavirostris*		

N	Area	Species observed	Notes	References
49	eastern Mediterranean Sea: southern Aegean Sea	*S. coeruleoalba* *T. truncatus*		
50	eastern Mediterranean Sea: waters off Cyrenaica (Libya), western Levantine Sea	*P. macrocephalus* *S. bredanensis* *S. coeruleoalba*		
51	coastal waters of Israel, eastern Levantine Sea	*T. truncatus*	Regular presence in study area; density relatively high. Mean encounter rate: 1.91 animals/100 h of search effort, rising to 5.65/100 h in proximity of bottom trawls. Pop. in study area estimated at 360 individuals.	Scheinin 2010
52	coastal waters of southern Israel, possibly Egypt, eastern Levantine Sea	*D. delphis*	Hitherto unsuspected presence in large groups. Several sightings of large groups in recent years, contrasting with previous absence of the species from the area in the authors' collective experience.	Aviad Scheninin, Dani Kerem, Oz Goffman, pers. comm.
53	coastal waters off central Lebanon	*T. truncatus*	The three first Lebanese systematic cetacean survey cruises conducted in Sept. 2009, April 2010 and June 2010.	Khalaf et al. 2010
54	Turkish Straits System (Bosphorus, Marmara Sea and Dardanelles)	*D. delphis* *T. truncatus*	Migration corridor for aquatic animals between the Mediterranean and Black Seas, supposed including cetacean foraging and breeding habitat. Two line-transect vessel surveys conducted in the TSS. Abundance of bottlenose dolphins was estimated at 485 (203–1,197; 95% CI) and 468 (184–1,186; 95% CI), and abundance of common dolphins was estimated at 773 (292–2,059; 95% CI) and 994 (390–2,531; 95% CI) in October 1997 and August 1998, respectively. Abundance of harbour porpoises – the third regular species in the Bosphorus and Marmara Sea (Öztürk & Öztürk 1997, Öztürk et al. 2009) – was not reported.	Dede 1999, cited in IWC 2004
55	inshore waters in the northwestern, northern, northeastern and eastern Black Sea between the Danube delta and the Russian-Georgian border	*D. d. ponticus* *P. p. relicta* *T. t. ponticus*	A 12-mile-wide area (31,780 km^2), coinciding with the entire territorial waters of Ukraine and Russia in the Black Sea and containing cetacean critical habitats, was explored in September–October 2003 by means of line-transect vessel survey (2,230 km of effort). Uncorrected density estimates (indiv/km^2; 95% CI): harbour porpoises 0.04 (0.02–0.09), common dolphins 0.17 (0.09–0.31), and bottlenose dolphins 0.13 (0.08–0.22). Uncorrected abundance estimates (indiv; 95% CI): harbour porpoises 1,215 (492–3,002), common dolphins 5,376 (2,898–9,972), and bottlenose dolphins 4,193 (2,527–6,956). In addition, several smaller areas of the Ukrainian territorial sea were studied more intensively. For instance, a coastal area off southwestern Crimea, between Cape Sarych and Cape Khersones, was surveyed almost monthly during two years, between 2002 and 2004 (Birkun 2006)	Birkun et al. 2004
56	northwestern shelf area (Black Sea)	*D. d. ponticus* *P. p. relicta* *T. t. ponticus*	Important cetacean habitat (breeding/calving and foraging) especially during the warm season. An area of 22,630 km^2 within the Ukrainian EEZ surveyed by vessel (388 km of effort) in Sept. 2004. Uncorrected density estimates (indiv/km^2): common dolphins 0.08±0.04, bottlenose dolphins 0.12±0.07; uncorrected abundance estimates: common dolphins 1,776±798, bottlenose dolphins 2,619±1,637. Records of harbour porpoises (10 sightings, 23 animals) were not sufficient to obtain reliable density and abundance estimates.	Birkun & Krivokhizhin, in preparation

N	Area	Species observed	Notes	References
57	offshore area over the continental slope and deep-sea depression (central Black Sea)	*D. d. ponticus* *P. p. relicta*	Waters between the Ukrainian and Turkish territorial sea are known as mainly habitat of common dolphins. However, in September–October 2005 during line transect boat survey in this area (31,200 km^2, 660 km of effort) most sightings were represented by harbour porpoises. Uncorrected density estimates (indiv/km^2; 95% CI): harbour porpoises 0.26 (0.06–1.27), common dolphins 0.15 (0.05–0.51); uncorrected abundance estimates (indiv; 95% CI): harbour porpoises 8,240 (1,714–39,605), common dolphins 4,779 (1,433–15,945). No bottlenose dolphins were sighted.	Krivokhizhin et al. 2006
58	northeastern shelf area (Black Sea)	*D. d. ponticus* *P. p. relicta* *T. t. ponticus*	Reportedly important habitat of all three Black Sea cetacean subspecies. However, in August 2002 aerial line-transect survey between Cape Chauda in Crimea and Dagomys on Caucasian coast (7,960 km^2, 791 km of effort) revealed mainly bottlenose dolphins. Their uncorrected density and abundance were estimated at 0.10 indiv/km^2 (0.04–0.26; 95% CI) and 823 indiv. (329–2,057; 95% CI). Small number of sightings (8 and 1, respectively) did not allow to obtain correct estimates of harbour porpoise and common dolphin density and abundance.	Birkun et al. 2003
59	southeastern inshore waters (Black Sea)	*D. d. ponticus* *P. p. relicta*	High density overwintering area of common dolphins and harbour porpoises; winter foraging grounds of these species coincide at least with the southern part of the territorial sea of Georgia, from Cape Anaklia to the north to the Turkish border to the south. Bottlenose dolphins occur there sporadically. A vessel-based line transect survey (211 km of effort) was carried out in the area of 2,320 km^2 in January 2005. Uncorrected density estimates (indiv/km^2; 95% CI): harbour porpoises 1.54 (0.89–2.65), common dolphins 4.18 (2.16–8.11); uncorrected abundance estimates (indiv; 95% CI): harbour porpoises 3,565 (2,071–6,137), common dolphins 9,708 (5,009–18,814). Bottlenose dolphins were not found. There were three more surveys in the same area in spring, summer and autumn 2005 (Komakhidze & Goradze 2005).	Birkun et al. 2006
60	Kerch Strait	*P. p. relicta* *T. t. ponticus*	Migration corridor for aquatic animals (thousands of harbour porpoises migrate via the strait to the Azov Sea in spring and back to the Black Sea in autumn), breeding/calving area and foraging grounds for a (semi)resident community of bottlenose dolphins. Common dolphins normally do not visit the strait. Two aerial and one vessel-based line-transect surveys provided estimates of bottlenose dolphin abundance in the strait: 76 (30–192; 95% CI) in July 2001; 88 (31–243; 95% CI) in August 2002; and 127 (67–238; 95% CI) in August 2003. Very few harbour porpoises were recorded during those surveys: 5 sightings/12 indiv in 2001 and 4 sightings/4 indiv in 2002; in 2003, the estimated uncorrected abundance amounted to 54 porpoises (12–245; 95% CI). Two months later, on 12 October 2003, a mass migration of harbour porpoises was recorded (Krivokhizhin 2009): numerous groups of up to 15 individuals were sighted moving through the strait towards the Black Sea.	Birkun et al. 2002, 2003, 2004

N	Area	Species observed	Notes	References
61	Azov Sea	*P. p. relicta*	Important breeding/calving area and foraging grounds for a substantial part of the harbour porpoise population that spends in the Azov Sea the whole warm season and leaves Azov's waters before winter. Bottlenose dolphins visit the Sea of Azov on rare occasions. In July 2001, an aerial line-transect survey provided uncorrected estimates of harbour porpoise density and abundance in the entire Azov Sea (40,280 km^2) – 0.07 indiv/km^2 (0.03–0.16; 95% CI); 2,922 indiv (1,333–6,403; 95% CI) – and in its southern part (7,560 km^2) – 0.12 indiv/km^2 (0.04–0.36; 95% CI); 871 indiv (277–2,735; 95% CI). In August 2002 a more intensive aerial survey within the same southern area resulted in similar estimates: 0.12 indiv/km^2 (0.06–0.27; 95% CI) and 936 indiv (436–2,009; 95% CI).	Birkun et al. 2002, 2003

Table 20. List of studies which have yielded quantitative data on cetacean abundance and distribution in the ACCOBAMS area. Numbers in the first column refer to polygons which can be viewed in the accompanying Google Earth file <cetacean studies ACCOBAMS.kmz>.

Once the geographic extent is plotted of all cruises which were selected for providing information which is representative of cetacean presence in the Agreement area, seven outstanding polygons remain, which are still unsurveyed, or – as in the case of the Black Sea – were surveyed too long ago (in the 1960s-80s: Çelikkale et al. 1989, Mikhalev 2004a,b) to provide information relevant today. Although we are aware that plans exists for surveying some of these areas in the near future (e.g., the southern Tyrrhenian and the Tunisian Plateau), information from those locations is still unavailable and cannot be included in the present document. The unsurveyed polygons are listed in Table 21 and shown in Fig. 57 C. The fact that these areas are unclassified as far as cetacean presence is concerned does not imply that they do not contain important cetacean habitat; in fact, the opposite is likely to be true.

N	Unsurveyed Area	Notes: these areas are likely to contain:
62	southern Tyrrhenian Sea	Important habitat for at least fin whales, sperm whales, Cuvier's beaked whales, long-finned pilot whales, Risso's dolphins, short-beaked common dolphins, common bottlenose dolphins, striped dolphins.
63	outer Tunisian Plateau	Important habitat for at least fin whales, short-beaked common dolphins, common bottlenose dolphins, striped dolphins.
64	northern Aegean Sea	Important habitat for at least sperm whales, Cuvier's beaked whales, Risso's dolphins, short-beaked common dolphins, common bottlenose dolphins, striped dolphins, harbour porpoises.
65	Egyptian EEZ	Important habitat for at least short-beaked common dolphins, bottlenose dolphins, striped dolphins. Permission to survey denied by Egypt to IFAW (operating on behalf of ACCOBAMS; Boisseau et al. 2010).
66	coastal waters of Syria, northern Lebanon	Important habitat for at least common bottlenose dolphins.
67	western Black Sea	Important habitat for Black Sea common dolphins (primarily in offshore waters), bottlenose dolphins and harbour porpoises (primarily in inshore waters).
68	eastern Black Sea	
69	southern Black Sea	

Table 21. List of unsurveyed locations in the ACCOBAMS area. Numbers in the first column refer to polygons which can be viewed in the accompanying Google Earth file < cetacean studies ACCOBAMS.kmz>.

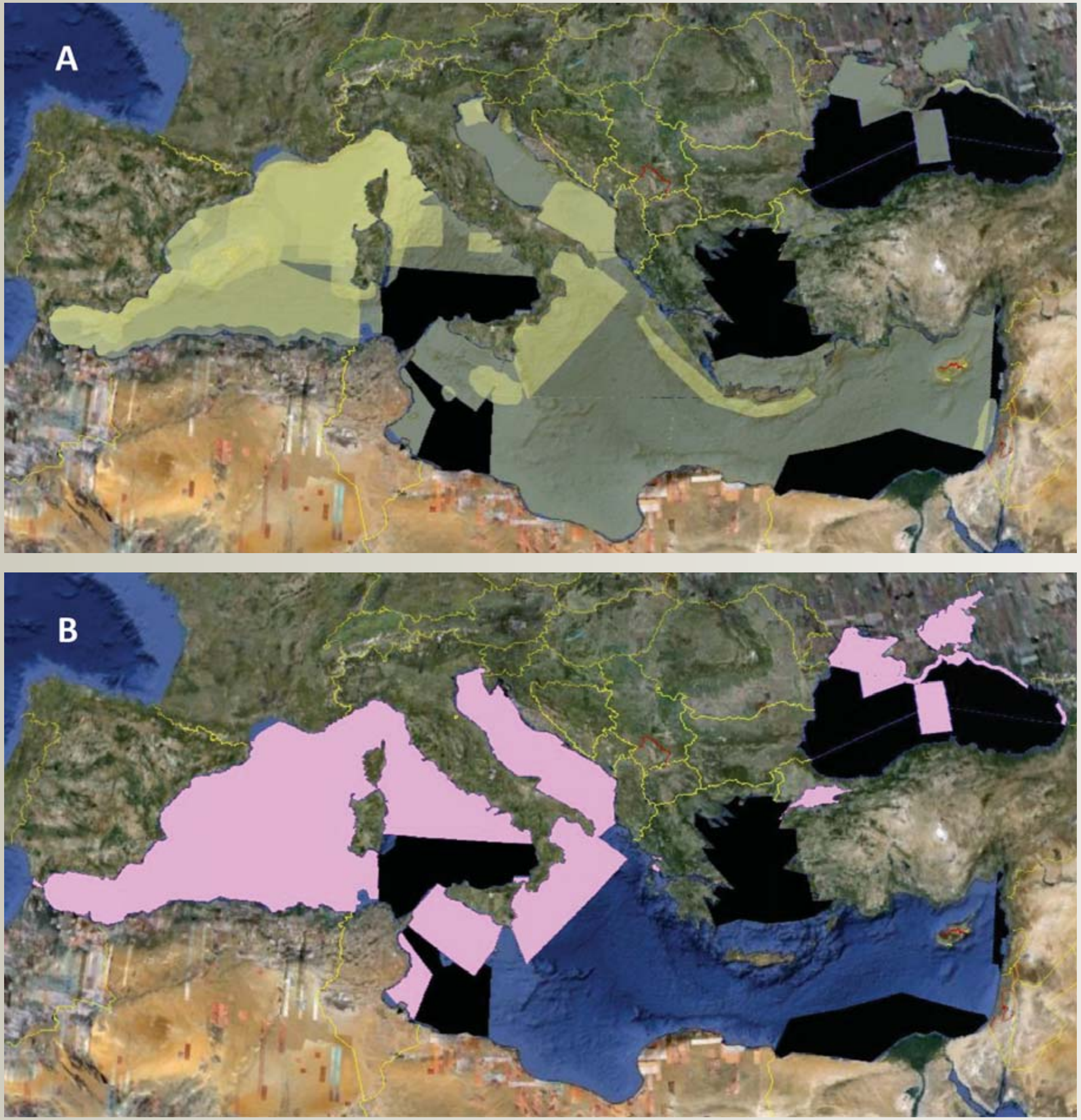
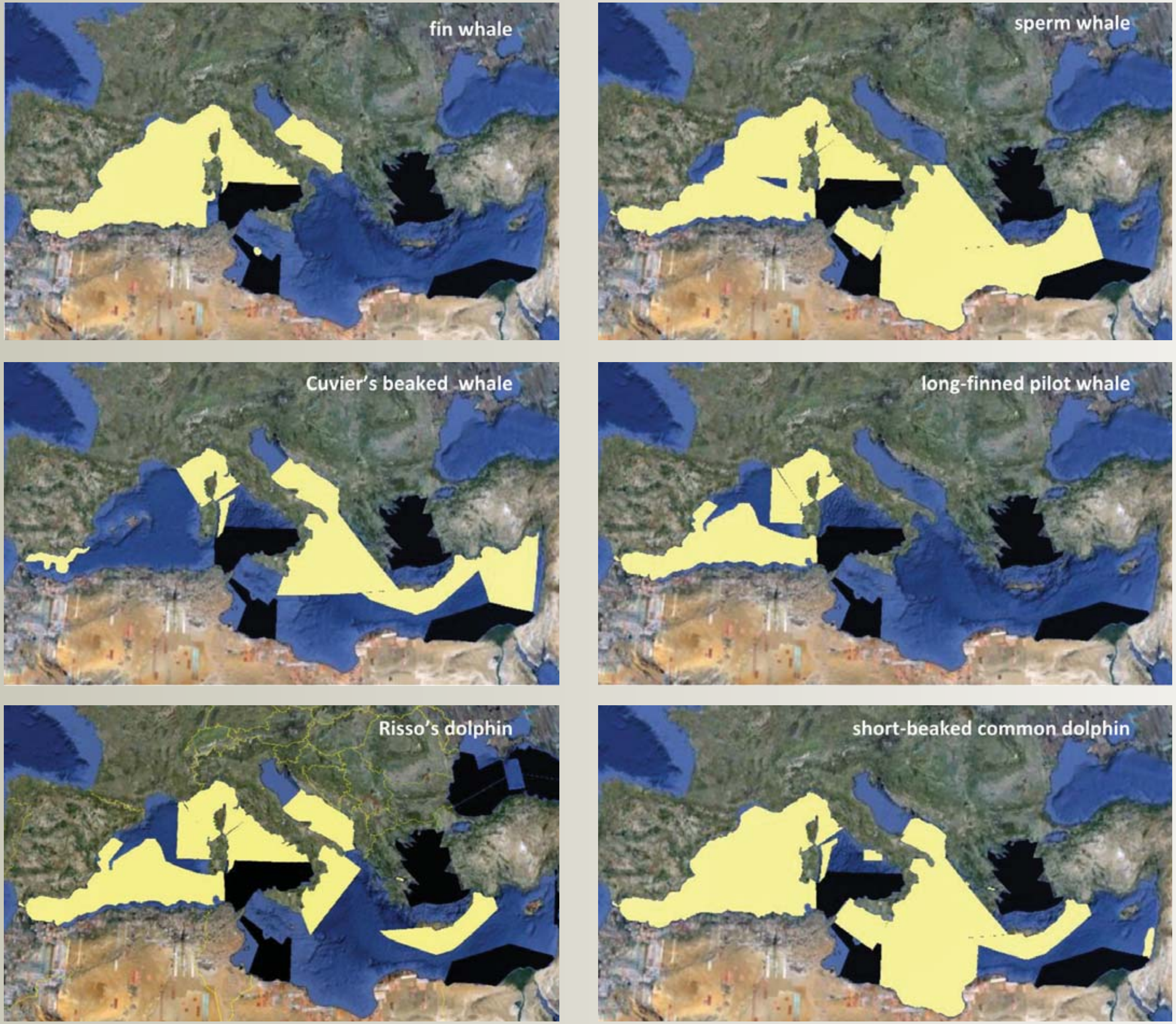

A
B

Fig. 57. Distribution of recent studies to collect ecological information on cetaceans in the ACCOBAMS area.
A. Overall distribution of studies. B. Studies in which cetacean density estimates were collected. C. Portions of the ACCOBAMS area (black polygons) which have remained unsurveyed to date (details in Table 21).


fin whale
sperm whale
Cuvier's beaked whale
long-finned pilot whale
Risso's dolphin
short-beaked common dolphin

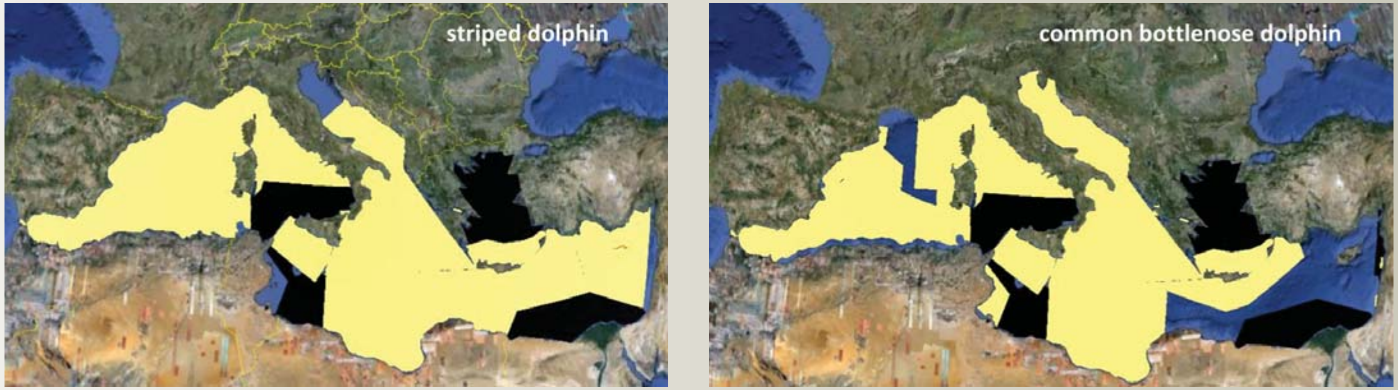
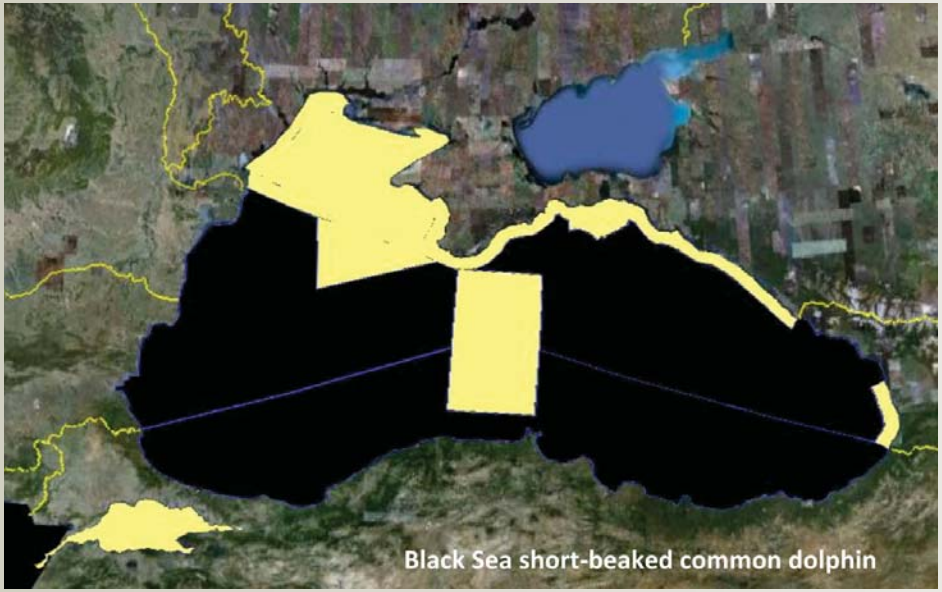
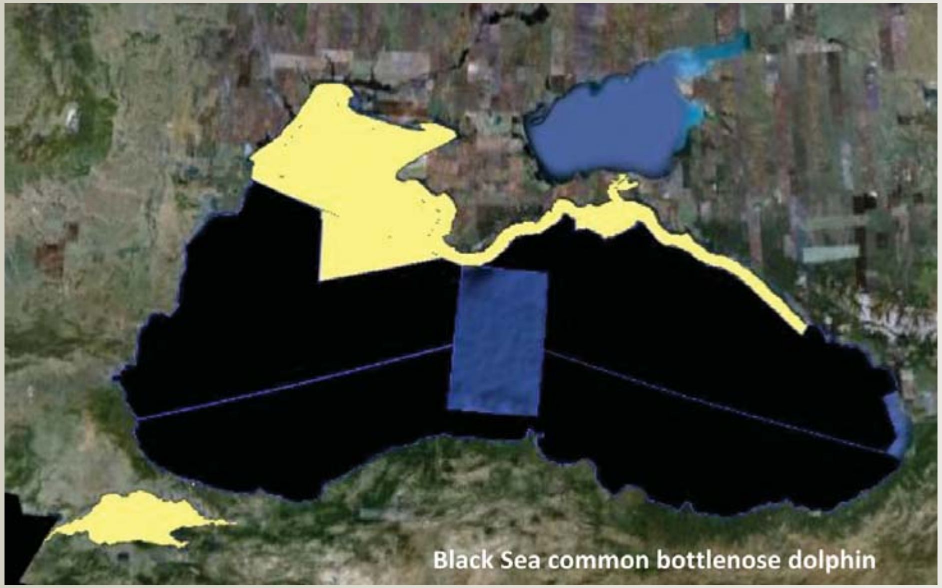


Fig. 58. Geographical extent of sighting cruises listed in Table 20 where eight cetacean species regular in the Mediterranean Sea were observed. Yellow shaded areas are indicative of reported presence, not actual presence or abundance. Unsurveyed areas are marked in black.


Black Sea short-beaked common dolphin


Black Sea common bottlenose dolphin

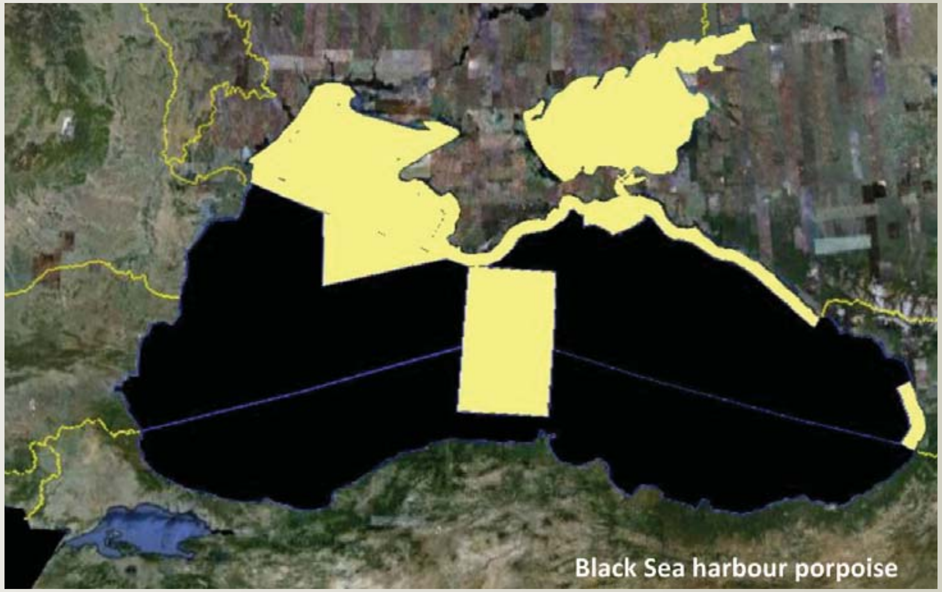


Fig. 59. Geographical extent of sighting cruises listed in Table 20 where three cetacean species regular in the Black Sea and Turkish Straits System were observed. Yellow shaded areas are indicative of reported presence, not actual presence or abundance. Unsurveyed areas are marked in black.

As stated before, the analysis presented in the previous pages is only a gross substitute of a detailed picture of the distribution and abundance of the various cetacean species in the ACCOBAMS area as can be provided through a synoptic survey, and certainly is inappropriate for a balanced and reliable identification of the critical habitats of the various species in the region. For a more complete approach, useful for conservation, the density of the data must increase, particularly in the southern and eastern portions of the Mediterranean and in the offshore and southern inshore areas of the Black Sea, and the collection of the data must continue in the future to allow detection of seasonal and inter-annual fluctuations in distribution and abundance. Once the data are sufficient to adequately represent the spatial and temporal variability of the animals' distribution, spatial models can be applied from which predictive habitat maps can be derived. One such effort, likely to become available at the end of 2010, is currently being carried out to describe the distribution of critical habitat of Cuvier's beaked whales in the Mediterranean, based on data contributed by a large number of corresponding organisations (Ana Cañadas, pers. comm.).

It is unfortunate that the raw data needed to conduct systematic and periodical reviews of conservation achievements of ACCOBAMS are to a large extent missing or inaccessible, because this prevents the development of a shared evidence of the need and effectiveness of conservation action (Pullin & Salafsky 2010). The data presented in Table 20 represent a small, mostly published sample of a much wider body of information that exist, but is inaccessible because the owners of the data have not decided yet to make such data public in the scientific literature, or otherwise available to the conservation community. To accelerate progress, the cetacean conservation and research community in the ACCOBAMS area should undergo a culture shift whereby making raw data accessible to all is as important as interpreting such data (Pullin & Salafsky 2010). Luckily, tools are now available to collate and store standardised data from sighting campaigns, which can be thus shared across organisations. One of the most appropriate of these tools is the OBIS SEAMAP *(Ocean Biogeographic Information System Spatial Ecological Analysis of Mega Vertebrate Populations)* global online database (Halpin et al. 2006). Accordingly, the ACCOBAMS Scientific Committee has recommended that cetacean researchers in the region be encouraged to contribute their data to OBIS SEAMAP, and an initiative from the Secretariat is ongoing to this effect in cooperation with the Whale & Dolphin Conservation Society.

- 7.2.1.3 **Investigating cetacean population structure**

In 2008 a “Population Structure Working Group” was established by the Scientific Committee, on the basis of the Work Programme adopted at the 3rd Meeting of Parties of ACCOBAMS, to recommend a strategy for progressing in the understanding of the population structure of cetaceans regular in the Agreement area. The ultimate goal of this effort will be to complete a genetic survey to assess the population identity and structure of the cetacean species regularly encountered in the ACCOBAMS area. Such effort is needed to identify the geographic boundaries of populations and assess the extent of their reproductive isolation, thus facilitating the identification of appropriate “units to conserve” (Gaspari & Natoli 2010b).

Genetic methods represent an important tool in the suite of techniques useful to determine such units. As an initial step, a database should be built of the available genetic samples currently stored in tissue banks, museums, collections and laboratories of various research organisations, to be used to orient targeted collections of new data and analyses to best meet ACCOBAMS conservation needs. Furthermore, the MEDACES database on samples collected on stranded cetaceans can serve as a basic source of relevant information. The "Population Structure Working Group" has not started operations yet, pending the securing of the needed minimal funding.

- 7.2.1.4 Mapping and overlaying impacts with distribution of critical habitats

The management and conservation of the world's oceans require a synthesis of spatial data on the distribution and intensity of human activities and the overlap of their impacts on marine ecosystems. This requirement is particularly evident when striving to conserve cetacean populations in the ACCOBAMS area, where the distribution of the species' critical habitats often overlap with the presence of highly impacting human activities, such as fishing, oil prospection and extraction, military exercises, and intense shipping often transporting hazardous substances. The effort of identifying cetacean critical habitat in the region (cf. 7.2.1.2) must be accompanied by the identification of the distribution of the main anthropogenic threats. Halpern et al. (2008) developed at a global scale an ecosystem-specific spatial model to synthesize 17 data sets of anthropogenic drivers of ecological change for 20 marine ecosystems, revealing that no area of the world's oceans is unaffected by human influence, and that a large fraction is strongly affected by multiple drivers. Those authors stressed that the analytical process they developed, and resulting maps, could provide flexible tools for regional and global efforts to allocate conservation resources, to implement ecosystem-based management, and to inform marine spatial planning, education, and basic research. Halpern et al.'s (2008) model is now being applied to the Mediterranean with a higher resolution, appropriate for a regional analysis (Fiorenza Micheli, Stanford University, pers. comm.), and this effort should be overlaid to known cetacean critical habitat to support conservation and management actions.

7.2.2. **Management effectiveness**

Implementing effective conservation of marine mammals in any of the world's marine regions is a challenge, and this is particularly true in the ACCOBAMS area due to the extent and intensity of human-derived pressure factors. One thing is for nations to resolve in good faith to undertake actions that may eventually bring to a better conservation status of cetaceans of the Mediterranean and Black Seas – as attested by the many resolutions adopted at the Meeting of Parties of ACCOBAMS – and another is putting such actions in practice, bearing the political costs involved in addressing conflicts between marine conservation and human activities at sea, striving to keep such activities sustainable, developing the actual capability and capacity of doing so, and ultimately ensuring in reality that cetaceans in the region are not worse off (and possibly better off) today than they were yesterday. The complexity of the task is daunting, and we should not be surprised if results have been very limited thus far.

Challenges involve, amongst other things, addressing the various threats deriving from interactions with fisheries, disturbance, ship strikes, pollution, noise, and climate change, which were mentioned in the preceding pages of this document. Here we will treat in greater detail two aspects of cetacean conservation that are particularly delicate: a) MPA designation and management, and b) setting up effective intervention plans and mechanisms to help animals that stranded alive.

MPA designation and management. The implementation of the resolutions of the Parties of ACCOBAMS as well as of the recommendations of the Scientific Committee as far as MPAs are concerned has only just begun. This work should accelerate in the lead up to 2012 to meet internationally agreed targets, although these now look very hard to attain, and not solely as far as cetacean conservation in the ACCOBAMS area is concerned (Wood et al. 2008). Information should be provided by the various Party governments on when they are planning to implement the initiatives they agreed upon at their 3rd Meeting in Dubrovnik, which included specific MPA-related actions. The process stimulated by UNEP's Mediterranean Action Plan should help to identify key areas in the Mediterranean Sea, which are important not only for the protection of cetaceans but also of marine biodiversity in a wider sense. A similar process should be stimulated in the Black Sea.

In fact, while MPAs can be envisaged to protect specific threatened species, it seems rather unrealistic to try to establish different MPAs to protect every single component of the biodiversity of a given region, and even protecting through

MPAs every threatened species of a given ecosystem would be a tough feat. However, selecting apex marine species having umbrella and/or flagship properties – such as cetaceans – can support the protection of a wider number of species, or marine biodiversity in general, ultimately enhancing the conservation status of the whole region. With this intention, collaborative efforts were undertaken to map the habitats of several groups of marine top predators, in a process in which expert-derived spatial knowledge was made to overlap (Hoyt & Notarbartolo di Sciara 2008, Notarbartolo di Sciara & Agardy 2010). These efforts were intended to support the identification of *Ecologically or Biologically Significant Areas* (EBSAs) in the Mediterranean, an initial step in the planning of representative regional MPA networks, and to facilitate a process whereby experts from different taxonomic fields are induced to interact together, towards the common goal of protecting an ecosystem containing different elements of its biodiversity.

Ultimately, recognising that MPAs and MPA networks are not the only route for marine habitat and species protection, a holistic conservation strategy for cetaceans in the ACCOBAMS area should be reassessed to integrate the MPA network tool with “conventional” measures. In particular, marine (or maritime, in EU jargon) spatial planning (MSP), including ocean zoning, can provide a framework for accommodating the widest range of stakeholders or ocean-users in a potentially less combative process. It is envisioned that some countries, especially those that have been slow to embrace the idea of MPAs and MPA networks, might be more ready to engage in MSP including habitat protection for cetaceans in MPAs, special zones or the equivalent.

Intervention in support of live-stranded cetaceans. Luckily, live strandings in the ACCOBAMS area are rare if compared with the stranding of carcasses, and mass strandings of live cetaceans in the region are even rarer (e.g., Bearzi et al. in press), and certainly much less frequent than in many oceanic areas. Nevertheless, when these events occur they pose a number of challenges that remain largely unsolved. These include:

• when a cetacean strands, even if it is alive at the time of stranding, its chances of survival in the wild are negligible. Even in the unlikely case that the stranded animal is perfectly healthy, very often during the stranding event, in addition to secondary damage connected with the mechanics of stranding which decreases its fitness, the animal has become separated from its population, and it may be very difficult to ensure that it gets back once released; this may be particularly challenging when the stranded animal is a suckling calf, whose survival is dependent on the presence of its mother. If the animal strands due to some form of illness, its chances are even lower. Therefore, although immediate return to the sea may be an option when the animal is manageable, healthy, and able to function normally; logistical and environmental conditions are favourable; social obligations (e.g., maternal care for the young) can be met; and the area of release is within the normal range of the animal, suitable and navigable, single-stranded odontocetes are usually poor candidates for immediate release (Perrin & Geraci 2008).

• If the cetacean is of a small size and can be moved, rescue and rehabilitation may be attempted by hosting it in a facility adequate to the task (e.g., an aquarium with sufficiently large tanks and veterinary competence). The basic criteria for making a decision are the following: (1) whether logistical support is available (e.g., a large dolphin or whale cannot be transported without a truck and means to safely move the animal to and from the truck), (2) the number of animals involved (a mass stranding is a logistical nightmare), (3) the environmental conditions (rough seas, harsh terrain, darkness, or simply a rising tide can increase the risk to the animal and the team, or extremes of heat or cold may affect the animal's ability to thermoregulate), (4) condition of the animal (a healthy animal is resilient, whereas one that is ailing may not survive the ordeal associated with a rescue), (5) risk of spreading pathogens to contiguous animals, (6) risk to human safety, (7) ease of handling (a very large or struggling animal may be impossible to rescue), and (8) whether care facilities and resources are available (Perrin & Geraci 2008).

• However, if the animal survives in a controlled environment (such as an aquarium tank) and regains good health, it is not clear what should be done with it: releasing it back into the wild, unless some strict conditions apply, may be equivalent to killing it (Anon. 2007b), and the practice carries risky conservation implications for the wild populations; on the other hand, keeping a protected species in captivity indefinitely involves high costs, and may be illegal in many countries. It must be noted that the illegal practice of capturing and trading bottlenose dolphins for their further exploitation in captivity can be easily disguised as rescue and rehabilitation of live stranded or by-caught animals, as it has happened in Ukraine in 2007 (see Section 6.5).

• If the cetacean(s) is (are) large, the problem becomes even more intractable. Moving a large cetacean outside of the water is fraught with the risk of permanently damaging it, and our potential for bringing significant help is minimal. The basic consideration should be to take no action that will only prolong suffering (Perrin & Geraci 2008). This is, unfortunately, a relatively frequent occurrence along the shores of the Pelagos Sanctuary, where newborn fin whales which have been separated from their mothers due to some mishap come near shore and eventually strand due to stress and/or starvation.

• Euthanasia is an option when it is necessary to end the suffering of an animal in irreversibly poor condition, no rehabilitation facility is available for orphaned dependent young, rescue is impossible and no care facility is available, or animals persistently re-strand. The procedure should be carried out humanely by an experienced qualified person and only if essential equipment and materials are available (Perrin & Geraci 2008). However euthanasia may be a serious problem if clumsily attempted without adequate equipment or expertise, and if conducted in front of an uninformed public. The general public has become very sensitive to these events in recent years (Bearzi et al. 2010b), may not understand or not accept the decision of euthanizing a whale, and react negatively. Therefore, in addition to the creation of a legal framework permitting the performing of euthanasia on a protected species, an adequate preparation to increase awareness of the general public is essential.

• If a large cetacean, after having stranded alive, subsequently dies (which may also be the case of a large cetacean carcass that drifts ashore), another problem which must be solved is the disposal of the body, to address concerns of public and environmental hygiene and health. This requires careful prearrangements (e.g., availability of moving machinery, adequate space for disposal, training), as the recent case of seven live-stranded subadult sperm whales in southern Italy has demonstrated (Mazzariol 2010).

Fig. 60. Powerless bystanders contemplate the stranding of seven live subadult male sperm whales on the coast of Apulia, Italy in December 2009. Photograph by Silvia Bonizzoni/Tethys Research Institute.

Considering the complexity of issues related to interventions in case of live strandings, the Scientific Committee of ACCOBAMS recommended that an efficient contingency mechanism to deal with these events should be created in the ACCOBAMS area. Problems are related mostly to the significant effort and logistical and technical difficulties often required to intervene to rescue one or more animals stranded, the very low potential of effectively rescuing the animals' life in many cases due to their conditions before and/or during the stranding, and the delicate aspects of correctly dealing with the public's opinions and expectations. Given the still largely unresolved nature of all these issues, it was recommended that an international workshop be organised to discuss the various options for intervention and help drafting guidelines to support procedures during such occurrences in the future.

7.2.3. Awareness and values

Despite human fascination with cetaceans and protective legislation in the ACCOBAMS area, conservation efforts for these marine mammals have achieved limited results to date, and by consequence cetacean populations still face an uncertain future in the region. Considering that all conservation problems derive to cetaceans from human activities, management efforts will achieve little without popular support; to obtain a real improvement, human societies must understand and accept to modify their values and re-calibrate activities that contribute to the demise of marine mammals and of the marine ecosystems they live in (Reynolds et al. 2009). Societal attitudes towards cetaceans have changed dramatically over time in wide portions of the ACCOBAMS area, with a steep turnaround in the 1970-80s, when the popular view that whales are malicious monsters to be antagonized was replaced by a generalised sense of awe and compassion (Bearzi et al. 2010b). However, a deeper, more pervasive process is needed if real conservation results are to be achieved. "The value of conservation must be elevated from an aesthetically pleasing concept championed when convenient to a fundamental construct of our lives and futures", requiring "a clear vision of future conservation goals and the roles of societies in achieving them, long-term planning and commitment of resources, rigorous science to resolve critical uncertainties, precautionary protection of habitats and ecosystems in the face of such uncertainty, and an interdisciplinary, comprehensive approach to conservation that engages the social sciences and humanities to elevate the value of conservation over short-term economic gain and many other competing values" (Reynolds et al. 2009).

Fisheries provide a case in point on the importance of the evolution of human values to marine conservation. Ecosystem-based fishery management (EBFM) requires accounting for indirect effects (e.g., habitat destruction, by-catch, and competition between fisheries and protected species such as cetaceans), as well as dealing with non-commensurate values such as production of off-spring by the mammals competing for the same resource; the perspective of EBFM requires that the rate of mortality caused by fishing is less than the value provided by the fishery itself (Richerson et al. 2010). The ecosystem-based approach to marine management called for by the European Marine Strategy Framework Directive provides a powerful opportunity for a comprehensive policy for protecting, improving and sustainably using Europe's environmentally degraded seas (Mee et al. 2007), and the effects of this policy – which will also positively cascade towards cetacean conservation – are likely to spill over throughout the region, thus affecting European and non-European riparian States alike. Mee et al. (2007) argued that the meaning conferred upon the concept of ''Good Environmental Status'' closely relates to human values, and its implementation is tightly connected with considerations such as the assignation of reference states, the balance between precautionary and evidence-based action, the degree of subsidiarity, and conservation strategies including MPAs and species protection; as a consequence, the success of this approach will ultimately depend upon public understanding and acceptance.

There can be no doubt that awareness and education of the wide public are key to effective conservation, and it is in this domain, rather than in the scientific and legal domains, that progress is most needed. Awareness programmes and campaigns targeting amongst others the general public, the schools, the teachers, the media, and the judiciary and enforcement communities, should be professionally conducted year after year, in all concerned nations, tailored to the different cultural sensitivities represented in the region, and adequately funded. Much of what is going wrong with the world is the result of inadequate and misdirected education that alienates us from life in the name of human domination; the crisis humanity is facing, of mind, perception, and values, is first and foremost an educational challenge (Orr 1994). Important reorganisations of educational curricula are needed to draw out our innate affinity for life, and conservation biologists should contribute to this change, because they have an ethical obligation to make a powerful case for the conservation of biodiversity to everyone, everywhere (Noss 2007).

8. Conclusions: time for drawing up a new strategy?

There is no doubt that we have a moral obligation to bequeath to future generations a world at least as good as the one we inherited from our parents, and this includes the biodiversity it contains. However, until now, dealing with the environment has been mired in a confrontation between idealism and the realities of daily living. What is needed is to properly integrate conservation into the real world needs of people's lives, work and play, and create effective economic incentives that recognize this reality of the human condition. Although we already know how to create a political and economic environment conducive to conservation, progress has been minimal because the political will to change for this leap is still insufficient (Schweitzer 2010).

Conserving cetaceans in the ACCOBAMS area is just one of the many aspects of this wider consideration. The positive intent of the Agreement and the commitment of the ACCOBAMS parties is beyond doubt, as demonstrated through the many resolutions adopted at their meetings. However, in adopting new resolutions, several of which are the carbon copies of previous resolutions, concern cannot be avoided that the level of implementation of the ACCOBAMS provisions is generally too slow or limited to effectively address the existing, and in some cases rapidly developing, environmental problems in the Agreement area. These problems are providing increasing stresses on the populations of cetaceans in the region, many of which continue to be thought to be critically endangered, endangered or vulnerable. At this rate it will become increasingly difficult, if not impossible, to reach the Agreement's goals, with significant negative effect on the status of the region's whales, dolphins and porpoises. For instance, urgent measures are needed to eradicate forever from the Mediterranean highly destructive fishing practices such as driftnets, long ago declared illegal by all relevant authorities. Cetaceans' critical habitat should not be ensonified *at libitum* by the military and the oil industry, causing massive stranding of these delicate mammals and likely displacing populations from their critical habitat. All the region's nations, with no exception, should agree to refrain from issuing permits for the live capture of dolphins from populations of unknown or threatened status, to be used in commercial enterprises disguised as therapeutic practices of questionable value. Fishing practices should be managed in a sustainable fashion, with an eye of regard for the wider ecosystem (as prescribed, amongst others, by European law), like in the eastern Ionian Sea where common dolphins – endangered in the Mediterranean – have recently been displaced from their prime habitat by the unsustainable exploitation of their main prey.

The gap between conservation science and action extends beyond conservation planning into many other applied sciences and has been linked to complexity of current societal problems, compartmentalization of knowledge and management sectors, and limited collaboration between scientists and decision makers. Transdisciplinary approaches have been proposed as a possible way to address these challenges and to bridge the gap between science and action. These approaches move beyond the bridging of disciplines to an approach in which science becomes a social process resolving problems through the participation and mutual learning of stakeholders (Reyers et al. 2010).

In most cases, however, simply deciding to do what nations have already agreed on doing would make a substantial difference. Management measures that will benefit cetaceans, involving sustainable fishing, curbing marine pollution and protecting biodiversity, are already embedded in a large number of existing legislation and treaties. If all such measures, prescribed by international, regional and national legal instruments for the prudent management of human activities in the Mediterranean and Black Seas were to be fully implemented and enforced, and if the range states were doing everything they had committed to, based on multiple obligations under agreements that they have ratified and that are already in force, many of the problems preventing whales, dolphins and porpoises from reaching a favourable conservation status would be adequately addressed, and the recovery of the populations would become possible. In other cases, the adoption of innovative, less invasive technologies connected with the human exploitation of the marine environment, which have become available in recent years, would concur to improve currently critical conditions if governments were to provide appropriate and targeted incentives for the concerned industries to develop and adopt them.

The negotiations of ACCOBAMS were concluded in 1996, and the Agreement came into force shortly thereafter. Fourteen years is a long time at the current pace of global change, and many of the conditions under which ACCOBAMS was formulated – involving societies and their values, governance, economics, technology, the environmental conditions, our scientific understanding of cetacean ecology and conservation, and, most relevantly, the status of the concerned populations – have all experienced substantive transformations during this period. We suggest that the time has now come for ACCOBAMS to reassess its accomplishments and failures, to identify its strong and weak points, and draw up a new 10-year strategy and action plan to best match the ongoing change and learn from the past experience. Throughout the process, nations concerned by the Agreement should recognise that protecting cetaceans and their environment goes beyond the realm of good intentions.

Eighteen years ago, addressing the world's nations gathered in Rio de Janeiro for the United Nations Conference on Environment and Development, H.S.H. Rainier III, Prince of Monaco, declared:

"Let us be careful of easy words and declarations of principle with no follow-up. Let us find the moral and political strength to apply the prescribed remedies so as to save the essential. It is up to us, Chiefs of State, to seize, together, this chance of long-term revival of our blue planet and so allow our children and future generations to evolve in a healthier and more equitable world."

Bringing about in the Mediterranean and Black Seas an agreement such as ACCOBAMS, in 1996, was an extraordinary accomplishment denoting the existence of an admirable vision amongst the region's leaders. Fourteen years later, the Agreement is as needed as ever. However, have the whales and dolphins noticed a difference? We suspect not; at least, not yet. Heeding the appeal of the Prince of Monaco seems like an obvious and urgent course of action to convince the world that ACCOBAMS continues to deserve a *raison d'être.*

9. Literature cited

Anonymous. 1926. Un cetaci al Prat de Llobregat. Butlletí de la Institució Catalana d'Història Natural, Barcelona, Jun-Oct. 1926:118.

Anonymous. 2007a. Black Sea Transboundary Diagnostic Analysis. UNDP GEF Black Sea Ecosystem Recovery Project, Istanbul, Turkey, 232 p.

Anonymous. 2007b. Guidelines for the release of captive cetaceans into the wild. ACCOBAMS. 5 p. Available from http://www.accobams.org

Anonymous. 2008. Vibo Valentia, trovato capodoglio morto in una spadara. Padovanews, 15.5.2008.

Anonymous. 2010. Progress report on the Med09 cruise. ACCOBAMS, 6th Meeting of the Scientific Committee, Casablanca, 11-13 January 2010. Document SC6-Inf 06. 21 p.

ACCOBAMS. 2003. Recommendation 2.2 from the Scientific Committee "on pelagic gillnets in the ACCOBAMS area", adopted in Istanbul, 20-22 November (accessible from http://www.accobams.org/sc/index.htm).

Affronte M., Stanzani L.A., Stanzani G. 2003. First record of a humpback whale, *Megaptera novaeangliae* (Borowski, 1781) in the Adriatic Sea. Annals of Istrian and Mediterranean Studies 13(1):51-54.

Agardy T. 1997. Marine protected areas and ocean conservation. Academic Press and R.G. Landes Company, Austin. 244 p.

Agardy T., Aguilar N., Cañadas A., Engel M., Frantzis A., Hatch L., Hoyt E., Kaschner K., LaBrecque E., Martin V., Notarbartolo di Sciara G., Pavan G., Servidio A., Smith B., Wang J., Weilgart L., Wintle B., Wright A. 2007. A global scientific workshop on spatio-temporal management of noise. Report of the Scientific Workshop. 51+vii pages.

Agazzi S., Bearzi G., Politi E. 2004. Common dolphin prey species in the eastern Ionian Sea: insight from fish scales sampled during surface foraging. European Research on Cetaceans 15:351-353.

Aguilar A. 1989. A record of two humpback whales, *Megaptera novaeangliae,* in the western Mediterranean Sea. Marine Mammal Science 5(3):30.6-309.

Aguilar A. 2000. Population biology, conservation threats and status of Mediterranean striped dolphins. Journal of Cetacean Research and Management 2(1):17-26.

Aguilar A., Borrell A. 1994. Abnormally high polychlorinated biphenyl levels in striped dolphins *(Stenella coeruleoalba)* affected by the 1990-1992 Mediterranean epizootic. Science of the Total Environment 154(2-3):237-47.

Aguilar A., Borrell A. 2004. DDT and PCB reduction in the western Mediterranean from 1987 to 2002, as shown by levels in striped dolphins *(Stenella coeruleoalba).* Marine Environmental Research 59:391-404.

Aguilar A., Borrell A., Reijnders P.J.H. 2002. Geographical and temporal variation in levels of organochlorine contaminants in marine mammals. Marine Environmental Research 53:425-452.

Aguilar A., Forcada J., Arderiu A., Borrell A., Monna A., Aramburu M. J., Pastor T., Cantos G. 1997. Inventario de los cetáceos de las aguas atlánticas peninsulares. Memoria final de proyecto. Instituto Nacional para la Conservación de la Naturaleza, Ministerio de Agricultura, Pesca y Alimentación. 184 p.

Aguilar A., Gaspari S. 2010. Striped dolphin, *Stenella coeruleoalba* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 8 p.

Aguilar A., Raga J.A. 1993. The striped dolphin epizootic in the Mediterranean Sea. Ambio 22(8): 524-528.

Aharoni I. 1944. Animals hitherto unknown to or little known from Palestine. Bulletin of the Zoological Society of Egypt. 6: 40-41.

Airoldi S., Azzellino A., Nani B., Ballardini M., Bastoni C., Notarbartolo di Sciara G., Sturlese A. 1999. Whale watching in Italy: results of the first three years of activity. European Research on Cetaceans 13:153-156.

Airoldi S, Bendinoni F, Azzellini A, Fadda V, Profice A. 2005. Abundance estimates of Risso's dolphins *(Grampus griseus)* in the western Ligurian Sea though photographic markrecapture. 19th Conference of the European Cetacean Society. 3-7 April, La Rochelle, France.

Akyol O., Erdem M., Unal V., Ceyhan T. 2005. Investigations on driftnet fishery for swordfish *(Xiphias gladius L.)* in the Aegean Sea. Turkish Journal of Veterinary and Animal Science 29:1225-1231.

Albert, Prince of Monaco. 1898. Some results on my research on oceanography. Nature 58(1496): 200- 204.

Alessandrini A. 1852. Catalogo del Gabinetto di Anatomia comparata della Pontificia Università di Bologna dalla sua fondazione all'ottobre 1852. Privately published.

Aliani S., Griffa A., Molcard A. 2003. Floating debris in the Ligurian Sea, northwestern Mediterranean. Marine Pollution Bulletin 46:1142- 1149. doi:10.1016/S0025- 326X(03) 00192-9

Allsopp M., Walters A., Santillo D., Johnston P. 2006. Plastic debris in the world's oceans. Greenpeace. 44 p.

Amaha A. 1994. Geographic variation of the common dolphin, Delphinus delphis *(Odontoceti: Delphinidae).* PhD thesis, Tokyo University of Fisheries, Japan. 211 p.

Arbocco G. 1969. I pinnipedi, cetacei e sirenii del Museo di Storia Naturale di Genova. Annali del Museo Civico di Storia Naturale di Genova 77:658-670.

Arcangeli, A., Muzi, E., Tepsich, P., Carcassi, S., Castelli, A., Crosti, R., Di Vincenzo, M., Magliozzi, C., Marini, L., Poggi, A., Poldi, A., Pulcini, M., Ricci, S., Safontas, C., Sdringola, S., Ukmar, E. 2009. Large-scale cetacean monitoring from passenger ferries in Italy: networking summer 2008 surveys. Proceedings of the 23rd Conference of European Cetacean Society, Istanbul, 2-4 March 2009. 6 p.

Archer F.I. 1997. Osteological variation in striped dolphins *(Stenella coeruleoalba).* Paper SC/49/SM28 presented to the International Whaling Commission Scientific Committee, October 1997 (unpublished). 30 p.

Azzellino A., Gaspari S., Airoldi S., Nani B. 2008. Habitat use and preferences of cetaceans along the continental slope and the adjacent pelagic waters in the western Ligurian Sea. Deep Sea Research Part I. 55:296-323. doi:10.1016/j.dsr.2007.11.006

Ballardini M, Pusser T., Nani B. 2005. Photo-identification of Cuvier's beaked whale *(Ziphius cavirostris)* in the Northern Ligurian Sea. 19th Annual Conference of the European Cetacean Society. La Rochelle, France. April 2-7.

Bascompte J., Melian C.J., Sala E. 2005. Interaction strength combinations and the overfishing of a marine food web. PNAS 102(15):5443–5447.

Bearzi G. 2002. Interactions between cetacean and fisheries in the Mediterranean Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 9, 20 p.

Bearzi G. 2003. Delphinus delphis (Mediterranean subpopulation). In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. Available from: http://www.redlist.org/apps/redlist/details/41762/0

Bearzi G., Agazzi S., Bonizzoni S., Costa M., Azzellino A. 2008a. Dolphins in a bottle: abundance, residency patterns and conservation of bottlenose dolphins *Tursiops truncatus* in the semi-closed eutrophic Amvrakikos Gulf, Greece. Aquatic Conservation: Marine and Freshwater Ecosystems 18:130-146. DOI: 10.1002/aqc.843

Bearzi G., Agazzi S., Gonzalvo J., Costa M., Bonizzoni S., Politi E., Piroddi C., Reeves R.R. 2008b. Overfishing and the disappearance of short-beaked common dolphins from western Greece. Endangered Species Research 5:1-12. doi: 10.3354/esr00103

Bearzi G., Agazzi S., Gonzalvo J., Bonizzoni S., Costa M., Petroselli A. 2010a. Biomass removal by dolphins and fisheries in a Mediterranean Sea coastal area: do dolphins have an ecological impact on fisheries? Aquatic Conservation: Marine and Freshwater Ecosystems 11 p. DOI: 10.1002/aqc.1123

Bearzi G., Costa M., Politi E., Agazzi S., Pierantonio N., Tonini D., Bastianini M. 2009. Cetacean records and encounter rates in the Northern Adriatic Sea during the years 1988-2007. Annales 19(2):145-150.

Bearzi G., Fortuna C.M. 2010. Common bottlenose dolphin, *Tursiops truncatus* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 10 p.

Bearzi G., Fortuna C.M., Reeves R.R. 2008c. Ecology and conservation of common bottlenose dolphins *Tursiops truncatus* in the Mediterranean Sea. Mammal Review doi: 10.1111/j.1365-2907.2008.00133.x

Bearzi G., Holcer D., Notarbartolo di Sciara G. 2004. The role of historical dolphin takes and habitat degradation in shaping the present status of northern Adriatic cetaceans. Aquatic Conservation: Marine and Freshwater Ecosystems 14:363-379.

Bearzi G., Notarbartolo di Sciara G., Politi E. 1997. Social ecology of bottlenose dolphins in the Kvarneri? (northern Adriatic Sea). Marine Mammal Science 13(4):650-668.

Bearzi G., Notarbartolo di Sciara G., Reeves R.R., Cañadas A., Frantzis A. 2004. Conservation Plan for short-beaked common dolphins in the Mediterranean Sea. ACCOBAMS, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. 90 p.

Bearzi G., Pierantonio N., Affronte M., Holcer D., Maio N., Notarbartolo di Sciara G. In press. Overview of sperm whale *Physeter macrocephalus* mortality events in the Adriatic Sea, 1555–2009. Mammal Review.

Bearzi G., Pierantonio N., Bonizzoni S., Notarbartolo di Sciara G., Demma M. 2010b. Perception of a cetacean mass stranding in Italy: the emergence of compassion. Aquatic Conservation: Marine and Freshwater Ecosystems 11 p. DOI: 10.1002/ aqc.1135

Bearzi G., Politi E., Agazzi S., **Azzellino A.** 2006. Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (central Mediterranean). Biological Conservation 127(4):373-382.

Bearzi G., Politi E., Agazzi S., Bruno S., Costa M., Bonizzoni S. 2005. Occurrence and present status of coastal dolphins *(Delphinus delphis* and *Tursiops truncatus)* in the eastern Ionian Sea. Aquatic Conservation: Marine and Freshwater Ecosystems 15:243-257.

Bearzi G., Politi E., Notarbartolo di Sciara G. 1999. Diurnal behavior of free-ranging bottlenose dolphins in the Kvarneric (northern Adriatic Sea). Marine Mammal Science 15(4):1065-1097.

Bearzi G., Reeves R.R., Notarbartolo di Sciara G., Politi E., Cañadas A., Frantzis A., Mussi B. 2003. Ecology, status and conservation of short-beaked common dolphins *Delphinus delphis* in the Mediterranean Sea. Mammal Review 33(3):224-252.

Bearzi G., Reeves R.R., Remonato E., Pierantonio N., Airoldi S. 2010c. Risso's dolphin *Grampus griseus* in the Mediterranean Sea. Mammalian Biology. doi:10.1016/j.mambio.2010.06.003

Beaubrun P.-C. 1995. Atlas préliminaire de distribution des cétacés de Méditerranée. CIESM, Monaco. 87 p.

Beaubrun P.-C. 2002. Disturbance to Mediterranean cetaceans caused by whale watching. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 12, 26 p.

Beltrame A. 1933. Duro a morire (colour plate depicting the capture of a false killer whale in the Strait of Messina). La Domenica del Corriere 35(12):16.

Ben Naceur L., Gannier A., Bradai M.N., Drouot V., Bourreau S., Laran S., Khalfallah N., Mrabet R., Bdioui M. 2004. Recensement du grand dauphin Tursiops truncatus dans les eaux tunisiennes. Bull. Inst. Natn. Scien. Tech. Mer de Salammbô 31:75-81.

Beneden M.P.J. van. 1889. Histoire naturelle des delphinidés des mers d'Europe. F. Hayez, Bruxelles, 253 p.

Bérubé M., Aguilar A., Dendanto D., Larsen F., Notarbartolo di Sciara G., Sears R., Sigurjonsson J., Urban J., Palsbøll P.J. 1998. Population genetic structure of North Atlantic, Mediterranean Sea and Sea of Cortez fin whales, *Balaenoptera physalus* (Linnaeus 1758): analysis of mitochondrial and nuclear loci. Molecular Ecology 7(5):585-599.

Bianchi C.N., Morri C. 2000. Marine biodiversity of the Mediterranean Sea: situation, problems and prospects for future research. Marine Pollution Bulletin 40(5):367-376.

Birkun A., Jr. 2002a. Cetacean direct killing and live capture in the Black Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 6, 10 p.

Birkun A., Jr. 2002b. Interactions between cetaceans and fisheries in the Black Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 10, 11 p.

Birkun A., Jr. 2002c. Cetacean habitat loss and degradation in the Black Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 8, 19 p.

Birkun A., Jr. 2002d. Disturbance to cetaceans in the Black Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 14, 7 p.

Birkun A., Jr. 2005. Bottom-set gillnet fisheries and harbour porpoises in the Black Sea: High-tech against cetaceans. FINS (Newsletter of ACCOBAMS) 2(1): 10.

Birkun A., Jr. 2006. Cetaceans (Cetacea). Pp. 314-332 in: Y.P. Zaitsev et al. (Eds.), The North-Western Black Sea: Biology and Ecology. Naukova Dumka, Kiev, 703 p. (In Russian).

Birkun A., Jr. 2008a. The state of cetacean populations. Pp.365-399 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Birkun A.A., Jr. 2008b. *Tursiops truncatus ssp. ponticus.* In: IUCN 2008. 2008 IUCN Red List of Threatened Species. <www.iucnredlist.org>

Birkun A.A., Jr. 2008c. *Delphinus delphis ssp. ponticus.* In: IUCN 2008. 2008 IUCN Red List of Threatened Species. <www.iucnredlist.org>

Birkun A. 2008d. Cetacean-fisheries conflicts in the Black Sea Region. International Workshop on Cetacean Bycatch within the ACCOBAMS Area (Rome, Italy, 17-18 September 2008). Working paper, 22 p. (Unpublished).

Birkun A., Jr. 2009. Plastic waste cause fishing nets to kill more Black Sea marine mammals. FINS (Newsletter of ACCOBAMS) 4(2): 17-18.

Birkun A., Jr., Cañadas A., Donovan G., Holcer D., Lauriano G., Notarbartolo di Sciara G., Panigada S., Radu G., van Klaveren M.-C. 2006. Conservation Plan for Black Sea Cetaceans. ACCOBAMS. 50 p.

Birkun A.A., Jr., Frantzis A. 2008. *Phocoena phocoena ssp. relicta.* In: IUCN 2008. 2008 IUCN Red List of Threatened Species. <www.iucnredlist.org>

Birkun A., Jr., Glazov D., Krivokhizhin S., Mukhametov L. 2002. Distribution and abundance of cetaceans in the Sea of Azov and Kerch Strait: Results of aerial survey (July 2001). Pp. 317-320 in: European Research on Cetaceans ? 16. Proc. 16th Ann. Conf. ECS, Liege, Belgium, 7-11 April 2002 (Eds. P.G.H. Evans, C.H. Lockyer, L. Buckingham and T. Jauniaux). European Cetacean Society, Kiel, Germany. 380 p.

Birkun A., Jr., Glazov D., Krivokhizhin S., Nazarenko E., Mukhametov, L. 2003. Species composition and abundance estimates of cetaceans in the Kerch Strait and adjacent areas of the Black and Azov Seas: the second series of aerial surveys (August 2002). P. 397 in: European Research on Cetaceans ? 17. Proc. 17th Ann. Conf. ECS, Las Palmas de Gran Canaria, Spain, 9-13 March 2003 (Eds. P.G.H. Evans, P. Anderwald and M. André). European Cetacean Society, Kiel, Germany. 470 p.

Birkun A.A., Jr., Krivokhizhin S.V. 1996. Mammals of the Black Sea. Tavria, Simferopol, 96 p. (In Russian).

Birkun A. Jr., Krivokhizhin S. 2008. Hurricane, oil spill and cetaceans in the Kerch Strait. FINS (Newsletter of ACCOBAMS) 4(1): 22-23.

Birkun A.A., Jr., Krivokhizhin S.V., Glazov D.M., Shpak O.V., Zanin A.V., Mukhametov L.M. 2004. Abundance estimates of cetaceans in coastal waters of the northern Black Sea: Results of boat surveys in August-October 2003. Pp.64-68 in: Marine Mammals of the Holarctic: Collection of Scientific Papers after the 3rd Internat. Conf. (Koktebel, Ukraine, 11-17 October 2004). Moscow, 609 p.

Birkun A., Jr., Krivokhizhin S., Komakhidze A., Mukhametov L., Shpak O., Goradze I., Komakhidze G., Kryukova A. 2006. Wintering concentration of Black Sea cetaceans off the Crimean and Caucasian coasts. P. 203 in: Abstr. 20th Annual Conf. of the European Cetacean Society (Gdynia, Poland, 2-7 April 2006). 244 p.

Birkun A., Jr., Krivokhizhin S., Masberg I., Radygin G. 2009. Cetacean by-catches in the course of turbot and spiny dogfish fisheries in the north-western Black Sea. Pp. 15-16 in: Abstr. 23rd Annual Conf. of the European Cetacean Society (Istanbul, Turkey, 2-4 March 2009). 194 p.

Birkun A., Jr., Kuiken T., Krivokhizhin S., Haines D.M., Osterhaus A.D.M.E., van de Bildt M.W., Joiris C.R., Siebert U. 1999. Epizootic of morbilliviral disease in common dolphins *(Delphinus delphis ponticus)* from the Black Sea. Vet. Rec. 144(4): 85-92.

Black Sea Commission. 2007a. Marine litter in the Black Sea Region: A review of the problem. BSC Publ., Istanbul, Turkey, 160 p.

Black Sea Commission. 2007b. Report of the Black Sea Sub-regional Coordination Unit. Pp. 89-106 in: Report of the Third Meeting of the Contracting Parties to ACCOBAMS (Dubrovnik, Croatia, 22-25 October 2007). ACCOBAMS, 350 pp.

Black Sea Commission. 2008. State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Black Sea Commission. 2009. Implementation of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (2002-2007): A report by the Commission on the Protection of the Black Sea Against Pollution. Istanbul, Turkey, 252 p.

Black Sea Commission. 2010. Progress report on the implementation of the Conservation Plan for Black Sea Cetaceans (October 2007 – October 2009). 6th Meeting of the ACCOBAMS Scientific Committee (Casablanca, Morocco, 11-13 January 2010), SC6-Doc08, 17 p. (Unpublished).

Blanco C, Aznar J., Raga J.A. 1995. Cephalopods in the diet of *Stenella coeruleoalba* (Meyen, 1833) from the western Mediterranean during an epizootic in 1990. J. Zool., Lond. 237:151-158.

Blanco C., Raduan M.A., Raga J.A. 2006. Diet of Risso's dolphin *(Grampus griseus)* in the western Mediterranean Sea. Scientia Marina 70(3):407-411.

Blanco C., Salomon O., Raga J.A. 2001. Diet of the bottlenose dolphin *(Tursiops truncatus)* in the western Mediterranean Sea. Journal of the Marine Biology Association of the U.K. 81:1053-1058.

Boisseau O., Lacey C., Lewis T., Matthews J., Moscrop A., Danbolt M., McLanaghan R. 2010. Sighting rates from cetacean surveys in the Mediterranean Sea and contiguous regions. Journal of the Marine Biological Association of the United Kingdom doi:10.1017/S0025315410000342

Bompar J.M. 2000. Les cétacés de Méditerranée. Edisud, La Calade, Aix-en-Provence. 188 p.

Bortolotto A., Casini L., Stanzani L.A. 1992. Dolphin mortality along the southern Italian coast (June-September 1991). Aquatic Mammals 18(2):56-60.

Bowen W.D. 1997. Role of marine mammals in aquatic ecosystems. Marine Ecology Progress Series 158:267-274.

Brotons J.M., Munilla Z., Grau A.M., Rendell L. 2008. Do pingers reduce interactions between bottlenose dolphins and nets around the Balearic Islands? Endangered Species Research 5:301-308. doi: 10.3354/esr00104

Brunelli G., Fasella G. 1928. Su di un rarissimo cetaceo spiaggiato sul litorale di Nettuno. Atti dell'Accademia Nazionale dei Lincei, Rendiconti Classe di Scienze Fisiche matematiche e Naturali 6(7):85-87.

Bushuyev S.G., Savusin V.P. 2004. Observations of dolphins from fishing boats in the course of sprat trawling in the northwestern Black Sea. Pp. 113-116 in: Marine Mammals of the Holarctic: Collection of Scientific Papers after the 3rd Internat. Conf. (Koktebel, Ukraine, 11-17 October 2004). Moscow, 609 p.

Busnel R.-G., Dziedzic A. 1968. Caractéristiques physiques des signaux acoustiques de *Pseudorca crassidens* Owen (cétacé odontocète). Mammalia 32:1-5.

Cagnolaro L. 1996. Profilo sistematico e tipologico delle raccolte di cetacei attuali nei musei italiani. Museologia Scientifica 13(Suppl.):193-212.

Cagnolaro L., Cozzi B., Magnaghi L., Podestà M., Poggi R., Tangerini P. 1986. Su 18 cetacei spiaggiati sulle coste italiane dal 1981 al 1985: rilevamento biometrico ed osservazioni necroscopiche (Mammalia Cetacea). Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 127(1-2):79-106.

Cagnolaro L., Magnaghi L., Podestà M., Jann B. 1989. False killer whale *Pseudorca crassidens* - a rare stranding for the Italian coast. European Research on Cetaceans 3:65-66.

Cagnolaro L., Notarbartolo di Sciara, G. 1992. Research activities and conservation status of cetaceans in Italy. Boll. Mus. Ist. Biol. Genova 56-57:53-85.

Calzada N., Aguilar, A. 1995. Geographical variation of body size in Western Mediterranean striped dolphins *(Stenella coeruleoalba)*. Zeitschrift fu¨r Säugetierkunde 60:257-64.

Cañadas A. 2010a. Cuvier's beaked whale, *Ziphius cavirostris* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 7 p.

Cañadas A. 2010b. Long-finned pilot whale, *Globicephala melas* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 5 p.

Cañadas A., de Stephanis R. 2010. Killer whale, *Orcinus orca* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 5 p.

Cañadas A., Hammond P.S. 2006. Model-based abundance estimates for bottlenose dolphins off southern Spain: implications for conservation and management. Journal of Cetacean Research and Management 8(1):13-27.

Cañadas A., Hammond P.S. 2008. Abundance and habitat preferences of the short-beaked common dolphin *(Delphinus delphis)* in the south-western Mediterranean: implications for conservation. Endangered Species Research 4:309-331. doi: 10.3354/esr00073

Cañadas A., Sagarminaga R. 2000. The northeastern Alborán Sea, an important breeding and feeding ground for the long-finned pilot whale *(Globicephala melas)* in the Mediterranean Sea. Marine Mammal Science 16(3):513-529.

Cañadas A., Sagarminaga R., de Stephanis R., Urquiola E., Hammond P.S. 2005. Habitat selection modelling as a conservation tool: proposals for marine protected areas for cetaceans in southern Spanish waters. Aquatic Conservation: Marine and Freshwater Ecosystems 15:495-521.

Cañadas A., Sagarminada R, Garc®¨a-Tiscar S. 2002. Cetacean distribution related with depth and slope in the Mediterranean waters off southern Spain. Deep Sea Research I 49:2053-2073.

Canese S., Cardinali A., Fortuna C.M., Giusti M., Lauriano G., Salvati E., Greco S. 2006. The first identified winter feeding ground of fin whales *(Balaenoptera physalus)* in the Mediterranean Sea. Journal of the Marine Biological Association of the United Kingdom 86(5119):1-5.

Capellini G. 1877a. Sulla balenottera di Mondini, rorqual de la mer adriatique di G. Cuvier. Mem. Accad. Sci. Bologna 3(7):413-418.

Capellini G. 1877b. Della balena di Taranto, confrontata con quelle della Nuova Zelanda, e con talune fossili del Belgio e della Toscana. Tipi Gamberini e Parmeggiani, Bologna. 34 p.

Carrillo-Álvarez J.M, Agusti C., Tomás J. Raga J.A. 2009. Progress report on the Mediterranean Database of Cetacean Strandings (MEDACES). Contract RAC/SPA, nº 8/RAC/SPA/2009. 38 p.

Carruccio A. 1899. Sovra una balenoptera rostrata presa recentemente a Porto Santo Stefano (Grosseto). Bollettino della Società Romana per gli Studi Zoologici 8(3-4-5-6):89-93.

Carruccio A. 1900. Sovra uno scheletro completo di Balaenoptera rostrata. Bollettino della Società Zoologica Italiana 1(2):18-29.

Carruccio A. 1913. Sulla *Balaenoptera acuto-rostrata* catturata per la prima volta nel mare laziale (Castel Fusano), e notizie su altri giganteschi cetacei arenati e catturati lungo le coste dello stesso mare nei tempi più remoti degli attuali. Bollettino della Società Zoologica Italiana, Serie III 2(5-6):157-169.

Casinos A. 1981. Notes on cetaceans of the Spanish coasts : III. A record of *Orcinus orca* (Linnaeus, 1758) from the island of Menorca.

Säugetierkundliche Mitteilungen 29:80.

Casinos A., Vericad J.R.. 1976. The cetaceans of the Spanish coasts: a survey. Mammalia 40:267-289.

Castellote, M., Esteban, J.A., Clark, C.W. 2008. Fin whale *(Balaenoptera physalus)* movements along the Spanish Mediterranean coast. J. Acoust. Soc. Am. 123:3775.

Castellote, M., Clark, C.W., Colmenares, F., Esteban, J.A. 2009. Mediterranean fin whale migration movements altered by seismic exploration noise. J. Acoust. Soc. Am. 125:2519.

Castells A., Mayo M. 1994. False killer whale *Pseudorca crassidens* (Owen 1846) in Mallorca, Balearic Islands (Spain). European Research on Cetaceans 8:86.

Çelikkale M.S., Karaçam H., Du¨zgu¨nes E., Ünsal, S., Durukanoglu H.F. 1989. Size and distribution of dolphin populations in the Black Sea. Doga Turk. Zool. Derg. 13(3):189-196.

Centro Studi Cetacei. 1990. Cetacei spiaggiati lungo le coste italiane. III. Rendiconto 1988. Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 130(21):269-287.

Centro Studi Cetacei.1991. Cetacei spiaggiati lungo le coste italiane. IV. Rendiconto 1989. (Mammalia). Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 131(27):413-432.

Centro Studi Cetacei. 1994. Cetacei spiaggiati lungo le coste italiane. VI. Rendiconto 1991. Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 133(19):261-291.

Centro Studi Cetacei. 1996. Cetacei spiaggiati lungo le coste italiane. VIII. Rendiconto 1993 (Mammalia). Atti. Soc. it. Sci. nat. Museo civ. Stor. Nat. Milano 135(2):437-450.

Centro Studi Cetacei. 1998. Cetacei spiaggiati lungo le coste italiane. XII. Rendiconto 1997. Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 139(2):213-226.

Centro Studi Cetacei. 2000. Cetacei spiaggiati lungo le coste italiane. XIII. Rendiconto 1998. Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 141(1):129-143.

Centro Studi Cetacei. 2004. Cetacei spiaggiati lungo le coste italiane. XVII. Rendiconto 2002 (Mammalia). Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 145(1):155-169.

Centro Studi Cetacei. 2006. Cetacei spiaggiati lungo le coste italiane. XIX. Rendiconto 2004. Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 147(1):145-157.

Chakroun F. 1994. Status of cetaceans in Tunisian marine waters. European Research on Cetaceans 8:107.

Clément S. 1881. L'hyperoodon de Baussard ou de Rutskoff (de Lacépède) (*Hyperoodon rostratus,* Duvernoy). Bulletin de la Socété d'Études des Sciences Naturelles de Nîmes, Jan. 1881:14-16.

Collet A. 1984. Live-capture of cetaceans for European institutions. Reports of the International Whaling Commission 34:603-607.

Commission of the European Communities. 2008. The role of the CFP in implementing an ecosystem approach to marine management. Communication from the Commission to the Council and the European Parliament. Brussels, 11.4.2008. COM(2008) 187 final. 11 p.

Committee on Taxonomy. 2009. List of marine mammal species and subspecies. Society for Marine Mammalogy. Available from: http://www.marinemammalscience.org/index.php?option=com_content&view=article&id=420&Itemid=280

Companyo L. 1841. Catalogue descriptif des Mammifères qui ont été observés et qui vivent dans le départment des Pyrénées-Orientales. Bull. Soc. Agric. Scient. Litt. Pyrén. Orient. 5:421-471.

Cornax M.J. 2007. The use of driftnets in the Mediterranean: 2007 update on the state of Italian and French fleets. An Oceana report to ACCOBAMS Secretariat. 9 p.

Cornalia E. 1870. Fauna d'Italia. Parte prima: catalogo descrittivo dei mammiferi osservati fino ad ora in Italia. Vallardi, Milano. 97 p.

Corsolini S., Focardi S., Kannan K., Tanabe S., Borrell A., Tatsukawa R. 1995. Congener profile and toxicity assessment of polychlorinated biphenyls in dolphins, sharks and tuna collected from Italian coastal waters. Marine Environmental Research 40(1):33-53.

Cotté, C., Guinet, C., Taupier-Letage, I., Mate, B., Petiau, E. 2009. Scale-dependent habitat use by a large free-ranging predator, the Mediterranean fin whale. Deep Sea Research Part I: Oceanographic Research Papers 56(5):801-811.

Cozzi B. 2010. Progress report on the Italian Tissue Bank. Document SC6-Doc24 presented to the 6th Meeting of the Scientific Committee of ACCOBAMS, Casablanca, 11-13 Jan. 2010. 5 p.

Dalebout M.L., Robertson K.M., Frantzis A., Engelhaupt D., Mignucci A.A., Rosario-Delestre R.J., Baker C.S. 2005. Worldwide structure of mtDNA diversity among Cuvier's beaked whales *(Ziphius cavirostris):* implications for threatened populations. Molecular Ecology 14: 3353-3371.

Dalgaard Balle J., MacKay A.I., Sagarminaga R. 2010a. Guidelines for the testing and use of AMD for depredation mitigation. Document BU_EXT1-Doc 13, ACCOBAMS, 28 April 2010. 6 p.

Dalgaard Balle J., MacKay A.I., Sagarminaga R. 2010b. Review of the effectiveness of acoustic devices and depredation mitigation as demonstrated in field studies to date. Document BU_EXT1-Doc 16, ACCOBAMS, 28 April 2010. 33 p.

Damiani G. 1911. Sovra una *Balaenoptera* del novembre 1910 a Marciana Marina (Elba). Bollettino della Società Zoologica Italiana 12:50-57.

D'Amico A., Bergamasco A., Zanasca P., Carniel S., Nacini E., Portunato N., Teloni, V., Mori C., Barbanti R. 2003. Qualitative correlation of marine mammals with physical and biological parameters in the Ligurian Sea. Journal of Oceanic Engineering 28(1): 29-43.

Das K., Holsbeek L., Browning J., Siebert U., Birkun A., Jr., Bouquegneau J.-M. 2004. Trace metal and stable isotope measurements (?^{13}C and ?^{15}N) in the harbour porpoise *Phocoena phocoena relicta* from the Black Sea. Environmental Pollution 131: 197-204.

David L. 2002. Disturbance to Mediterranean cetaceans caused by vessel traffic. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 11, 21 p.

de Stephanis R. 2005. Distribución de cetáceos en el Estrecho de Gibraltar en función de parámetros oceanográficos en condiciones estivales. M.Sc. thesis, Universidad de Cádiz. 67 p.

de Stephanis R., Perez Gimeno N., Salazar Sierra J., Poncelet E., Guinet C. 2002. Interactions between killer whales *(Orcinus orca)* and red tuna *(Thunnus thynnus)* fishery in the Strait of Gibraltar. Pp. 138-142 in: Fourth International Orca Symposium and Workshops, CEBC-CNRS, La Rochelle, 23-28 Sept. 2002.

de Stephanis R., Salazar Sierra J., Perez Gimeno N., Verborgh P., Tellez E., Rueda L. 2003. Collision between a ferry and a sperm whale *(Physeter macrocephalus)* in the Strait of Gibraltar. Conference Guide and Abstracts of the 17th Conference of the European Cetacean Society. 150 p.

de Stephanis R., Guinet C., Buisson L., Verborgh P., Dominici P. 2005a. Population status, social organisation and feeding strategies of killer whales *(Orcinus orca)* in the Strait of Gibraltar. 19th Annual Conference of the European Cetacean Society. La Rochelle, France. April 2-7.

de Stephanis R., Verborgh, P., Pérez Gimeno, N., Sánchez Cabanes, A., Pérez Jorge, S., Esteban Pavo, R., Séller, N., Urquiola, E., Guinet, C. 2005b. Impactos producidos por el tráfico marítimo en las poblaciones de cetáceos en el estrecho de Gibraltar. Situación actual y previsiones de futuro", Dirección General para la Biodiversidad del Ministerio de Medio Ambiente. 140 p.

Diasamidze E. 2010. Secrets of Batumi dolphinarium. Netgazeti.ge, 30 July 2010 <http://netgazeti.ge/GE/18/law/ 2127/> (In Georgian) + video.

Diaz Lopez B. 2006. Interactions between Mediterranean bottlenose dolphins *(Tursiops truncatus)* and gillnets off Sardinia, Italy. ICES Journal of Marine Science 63(5):946-951.

Di-Meglio N., David L. 2008. A particular year or the symptom of a global change in the distribution of large cetaceans in the northwestern Mediterranean Sea? Abstracts, 22nd Annual Conference of the European Cetacean Society, Egmond aan Zee, The Netherlands, 10-12 March 2008.

Di Natale A. 1983. Goosebeaked whale, *Ziphius cavirostris* G. Cuvier, and rough-toothed dolphin, *Steno bredanensis,* in the Italian seas. Rapports de la Commission Internationale de la Mer Méditerranée 28(5):203-204.

Di Natale A., 1983. The minke whale *(Balaenoptera acutorostrata)* in the Italian seas. Rapports de la Commission Intérnationale pour la Mer Méditerranéenne 28(5):205-206.

Di Natale A., Mangano A. 1981. Report of the progress of Project Cetacea. VI. July 1978 – October 1981. Memorie di biologia marina e di oceanografia. N. 5. Vol. 11. 49 p.

Di Natale A., Mangano A. 1983. Killer whale *Orcinus orca* (Linnaeus) and false killer whale, *Pseudorca crassidens* Owen, in the Italian seas. Rapports de la Commission Intérnationale pour l'Exploration Scientifique de la Mer Méditerranée 28:181-182.

Dolman S.J. 2007. Spatio-temporal restrictions as best practice precautionary response to ocean noise. Journal of International Wildlife Law and Policy 10:219-224. DOI: 10.1080/13880290701769270

Dolman S.J., Evans P.G.H., Notarbartolo di Sciara G., Frisch H. 2010. Active sonar, beaked whales and European regional policy. Marine Pollution Bulletin doi:10.1016/j.marpolbul.2010.03.034

Domingo M., Vilafranca M., Visa J., Prats N., Trudgett A., Visser I. 1995. Evidence for chronic morbillivirus infection in the Mediterranean striped dolphin *(Stenella coeruleoalba).* Veterinary Microbiology 44:229-239.

Drouot V., Bérubé M., Gannier A., Goold J.C., Reid R.J., Palsbøll P.J. 2004. A note on genetic isolation of Mediterranean sperm whales *(Physeter macrocephalus)* suggested by mitochondrial DNA. Journal of Cetacean Research and Management 6(1):29-32.

Duguy R. 1975. Rapport annuel sur les cétacés et pinnipèdes trouvés sur les côtes de France. IV. Année 1974. Mammalia 39(4):689-701.

Duguy R., Besson J., Casinos A., Di Natale A., Filella S., Raduàn A., Raga J., Viale D. 1983a. L'impact des activités humaines sur les cétacés de la Méditerranée occidentale. Rapports de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée 28:219-222.

Duguy R., Casinos A., Di Natale A., Filella S., Ktari-Chakroun F., Lloze R., Marchessaux D. 1983b. Repartition et fréquences des mammifères marins en Méditerranée. Rapports de la Commission Intérnationale pour l'Exploration Scientifique de la Mer Méditerranée 28:223-230.

Duguy R., Cyrus J.-L. 1976. Catalogue des mammifères marins conservés au museum de Marseille. Bulletin du Musée d'Histoire Naturelle de Marseille 36 :37- 39.

Engelhaupt D., Hoelzel A.R., Nicholson C., Frantzis A., Mesnick S., Gero S., Whitehead H., Rendell L., Miller P., de Stefanis R., Canadas A., Airoldi S., Mignucci-Giannoni A. 2009. Female philopatry in coastal basins and male dispersion across the North Atlantic in a highly mobile marine species, the sperm whale *(Physeter macrocephalus).* Molecular Ecology 18:4193-4205. doi: 10.1111/j.1365- 294X.2009.04355.x

Fernández A. 2006. Atypical mass stranding of Cuvier's beaked whales in Southern Spain. FINS, the Newsletter of ACCOBAMS 2(2):16-17.

Fernández A., Edwards J.F., Rodríguez F., Espinosa de los Monteros A., Herráez P., Castro P., Jaber J.R., Martín V., Arbelo, M. 2005. "Gas and Fat Embolic Syndrome" involving a mass stranding of beaked whales (family Ziphiidae) exposed to anthropogenic sonar signals. Veterinary Pathology 42:446-457.

Fernández A., Esperón F., Herraéz P., Espinosa de los Monteros A, Clavel C., Bernabe A., Sanchez Vizcaino J. M., Verborgh P., de Stephanis R., Toledano F. and Bayon A. 2008. Morbillivirus and pilot whale deaths, Mediterranean Sea. Emergent Infectious Diseases 14:792–794.

Fontaine M.C., Baird S.J.E., Piry S., Ray N., Tolley K.A., Duke S., Birkun A., Jr., Ferreira M., Jauniaux T., Llavona A., Öztürk B., Öztürk A.A., Ridoux V., Rogan E., Sequeira M., Siebert U., Vikingsson G.A., Bouquegneau J.-M., Michaux J.R. 2007. Rise of oceanographic barriers in continuous populations of a cetacean: the genetic structure of harbour porpoises in Old World waters. BMC Biology 5:30, doi:10.1186/1741-7007-5-30. <http://www.biomedcentral.com/1741-7007/5/30>

Fontaine M.C., Tolley K.A., Michaux J.R., Birkun A., Jr., Ferreira M., Jauniaux T., Llavona Á., Öztürk B., Öztürk A.A., Ridoux V., Rogan E., Sequeira M., Bouquegneau J.-M., Baird S.J.E. 2010. Genetic and historic evidence for climate-driven population fragmentation in a top cetacean predator: the harbour porpoises in European water. Proc. R. Soc. B, publ. online, doi:10.1098/rspb.2010.0412. <http://rspb.royalsociety-

publishing.org/content/early/2010/04/30/rspb.2010.0412.full>

Forcada J., Aguilar A., Hammond P.S., Pastor X., Aguilar R. 1994. Distribution and numbers of striped dolphins in the western Mediterranean Sea after the 1990 epizootic outbreak. Marine Mammal Science 10(2):137-50.

Forcada J., Aguilar A., Hammond P.S., Pastor X., Aguilar R. 1996. Distribution and abundance of fin whales *(Balaenoptera physalus)* in the western Mediterranean sea during the summer. Journal of Zoology, London 238:23-34.

Forcada J., Gazo M., Aguilar A., Gonzalvo J., Fernandez-Contreras M. 2004. Bottlenose dolphin abundance in the NW Mediterranean: addressing heterogeneity in distribution. Marine Ecology Progress Series 275:275-87.

Forcada J., Hammond P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39:313-25.

Forcada J., Notarbartolo di Sciara G., Fabbri F. 1995. Abundance of fin whales and striped dolphins summering in the Corso-Ligurian Basin. Mammalia 59(1):127-140.

Fortuna C.M. 2006. Ecology and conservation of bottlenose dolphins *(Tursiops truncatus)* in the north-eastern Adriatic Sea. A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, University of St. Andrews. 275 p.

Fossi M.C., Marsili L., Leonzio C., Notarbartolo di Sciara G., Zanardelli M., Focardi S. 1992. The use of non-destructive biomarker in Mediterranean cetaceans: Preliminary data on MFO activity in skin biopsy. Marine Pollution Bulletin 24(9):459-461.

Fossi M.C., Marsili L. 2003. Effects of endocrine disruptors in aquatic mammals. Pure Appl. Chem. 75(11-12):2235-2247.

Fossi M.C., Marsili L., Neri G., Casini S., Bearzi G., Politi E., Zanardelli M., Panigada S. 2000. Skin biopsy of Mediterranean cetaceans for the investigation of interspecies susceptibility to xenobiotic contaminants. Marine Environmental Pollution 50:517-521.

Frantzis A., 1998. Does acoustic testing strand whales? Nature, 392: 29.

Frantzis A., Alexiadou P., Paximadis G., Politi E. Gannier A., Corsini-Foka M. 2003. Current knowledge on the cetacean fauna of the Greek Seas. J. Cetacean Res. Manage. 5(3):219-232

Frantzis A., Gordon J., Hassidis G., Komnenou A. 2001. The enigma of harbor porpoise presence in the Mediterranean Sea. Marine Mammal Science 17(4):937-944.

Frantzis A., Herzing D.L. 2002. Mixed-species associations of striped dolphins *(Stenella coeruleoalba),* short-beaked common dolphins *(Delphinus delphis),* and Risso's dolphins *(Grampus griseus)* in the Gulf of Corinth (Greece, Mediterranean Sea). Aquatic Mammals 28(2):188-197.

Frantzis A., Nikolaou O., Bompar J.-M., Cammedda A. 2004. Humpback whale *(Megaptera novaeangliae)* occurrence in the Mediterranean Sea. Journal of Cetacean Research & Management 6(1):25-28.

Frantzis A., Swift R., Gillespie D., Menhennett C., Gordon J., Gialinakis S. 1999. Sperm whale presence off South-West Crete, Eastern Mediterranean Sea. In: European Research on Cetaceans - 13. Proc. 13th Ann. Conf. ECS, Valencia, 20-24 April, 1999, pp. 214-217.

Gambaiani D.D., Mayol P., Isaac S.J., Simmonds M.P. 2009. Potential impacts of climate change and greenhouse gas emissions on Mediterranean marine ecosystems and cetaceans. Journal of the Marine Biological Association of the United Kingdom 89(1):179-201.

Gannier A. 1995. Méditerranée nord-occidental: estimation de leur abondance et mise en relation de la variation saisonniére de leur distribution avec l'écologie du milieu. PhD Thesis. École Pratique des Hautes Études. Montpellier, France.

Gannier A. 1998. A contribution to the knowledge of the cetological fauna in the waters of western Sardinia. Hystrix 10(2):21-27.

Gannier A. 1999. Etude de la distribution des cétacés en mer d'Alborán et en mer des Baléares. Unpublished report to the Centre de recherche sur les Cetacés (Marineland) and the Groupe de Recherche sur les Cétacés (Antibes) – October 1999. 26 p.

Gannier A., Drouot V., Goold J.C. 2002. Distribution and relative abundance of sperm whales in the Mediterranean Sea. Mar. Ecol. Prog. Ser. 243:281-93.

Garcia-Martinez J., Moya A., Raga J.A., Latorre A. 1999. Genetic differentiation in the striped dolphin *Stenella coeruleoalba* from European waters according to mitochondrial DNA (mtDNA) restriction analysis. Molecular Ecology 8(6):1069-1073.

Garibaldi A., Turner N. 2004. Cultural keystone species: implications for ecological conservation and restoration. Ecology & Society 9(3):1-18.

Garibaldi F., Mignone W., Caroggio P., Ballardini M. 2008. Serological evidence of morbillivirus infection in striped dolphins (Stenella coeruleoalba) found stranded on the Ligurian Sea coast of Italy. Pp. 192–193 in: Pierce GJ, Philips E, Lick R (eds) Proc 22nd ECS Conference, Egmond aan Zee, The Netherlands, 10–12 March 2008. European Cetacean Society, Egmond aan Zee.

Gasco F. 1878. Intorno alla balena presa in Taranto nel febbraio 1877. Napoli, Tipografia dell'Accademia Reale delle Scienze. 47 p.

Gaspari S. 2004. Social and population structure of striped and Risso's dolphins in the Mediterranean Sea. PhD Thesis. University of Durham, UK. 184 p.

Gaspari S., Airoldi S., Hoelzel A.R. 2007a. Risso's dolphins *(Grampus griseus)* in UK waters are differentiated from a population in the Mediterranean Sea and genetically less diverse. Conservation Genetics 8(3):727-732.

Gaspari S., Azzellino A., Airoldi S., Hoelzel A.R. 2007b. Social kin association and genetic structuring of striped dolphins *(Stenella coeruleoalba)* population in the Mediterranean Sea. Molecular Ecology 16:2922-2933

Gaspari S., Natoli A. 2010a. Risso's dolphin, *Grampus griseus* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 5 p.

Gaspari S., Natoli A. 2010b. Population structure working group progress update. Document SC6-Inf05, 6th Meeting of the Scientific Committee of ACCOBAMS, Casablanca 11-13 Jan. 2010. 11 p.

Gazo M., Fernandez-Contreras M.M., Brotons J.M., Aguilar A. 2004. Interactions between bottlenose dolphins and artisanal fisheries in the Balearic Islands: may acoustic devices be a solution to the problem? European Research on Cetaceans 15.

Gazo M., Gonzalvo J., Aguilar A. 2008. Pingers as deterrents of bottlenose dolphins interacting with trammel nets. Fisheries Research 92:70-75. doi:10.1016/j.fishres.2007.12.016

Genov T., Kotnjek P., Lesjak J., Hace A., Fortuna M.C. 2008. Bottlenose dolphins *(Tursiops truncatus)* in Slovenian and adjacent waters (Northern Adriatic Sea). Annales 18(2):227-244.

Genov T., Kotnjek P., Lipej L. 2009. New record of the humpback whale *(Megaptera novaeangliae)* in the Adriatic Sea. Annales 19(1):25-30.

Giglioli E.H. 1880. Elenco dei mammiferi, degli uccelli e dei rettili ittiofagi appartenenti alla fauna italiana. Firenze. 55 p.

Giglioli E.H. 1882. Note intorno a un nuovo cetaceo nel Mediterraneo da riferirsi probabilmente al genere *Pseudorca.* Zoologischer Anzeiger 112:288-290.

Gil-de-Sola Cimarro L. 1992. Les mammifères marins du region sud-méditerranée (Espagne) pendant 1989-1991. Report to Consejo Internacional para la Exploración del Mar (CIEM). 4 p.

Gillespie A. 2007. The precautionary principle in the twenty-first century: a case study of noise pollution in the ocean. The International Journal of Marine and Coastal Law 22(1):61-87.

Giordano A. 1988. New data on the presence of Balaenoptera acutorostrata in the northwestern Mediterranean basin. European Research on Cetaceans 2:45-46.

Goffman O., Granit S., Hadar N., Kerem D., Podiadis V., Kent R., Ratner E., Roditi-Elasar M., Scheinin A., Spanier E. 2006. Cetacean species in Israeli Mediterranean waters: update 2000-2006. 3rd Annual Meeting of the Israeli Association for Aquatic Sciences. Haifa, May 23, 2006.

Gomerˇcič H., Gomerˇcič M.D., Gomerˇcič T., Lucic H., Dalebout M., Galov A., ?krtic D., Curkovic S., Vukovic S., Huber D. 2006. Biological aspects of Cuvier's beaked whale *(Ziphius cavirostris)* recorded in the Croatian part of the Adriatic Sea. European Journal of Wildlife Research 52:182–187.

Gómez de Segura A., Crespo E.A., Pedraza S.N., Hammond P.S., Raga J.A. 2006. Abundance of small cetaceans in the waters of the Central Spanish Mediterranean. Marine Biology 150:149-160.

Granier J. 1970-1972. Capture d'un Steno rostré (*Steno bredanensis* Lesson) dans le Golfe d'Aigues-Mortes. Bulletin de la Société des Etudes de Sciences Naturelles de Vaucluse 1970-1972:109-111.

Greenpeace International. 2009. High Seas Mediterranean Marine Reserves: a case study for the Southern Balearics and the Sicilian Channel. A briefing to the CBD's Expert workshop on scientific and technical guidance on the use of biogeographic classification systems and identification of marine areas beyond national jurisdiction in need of protection, Ottawa, 29 September–2 October 2009 58 p.

Güclüsoy H., Veryeri N., Cirik S. 2004. Cetacean strandings along the coast of Izmir Bay, Turkey. Zoology in the Middle East 33:163-168.

Güclüsoy H. 2005. News from Range States: Special from Turkey. Marine Mammal Research Group (DEMAG). FINS 2(1):16-17.

Halpern B.S., Walbridge S., Selkoe K.A., Kappel C.V., Micheli F., D'Agrosa C., Bruno J.F., Casey K.S., Ebert C., Fox H.E., Fujita R., Heinemann D., Lenihan H.S., Madin E.M.P., Perry M.T., Selig E.R., Spalding M., Steneck R., Watson R. 2008. A global map of human impact on marine ecosystems. Science (Washington D.C.) 319:948-952.

Halpin P.N., Read A.J., Best, B.D., Hyrenbach K.D., Fujioka E., Coyne M.S., Crowder L.B., Freeman S.A., Spoerri C. 2006. OBIS-SEAMAP: developing a biogeographic research data commons for the ecological studies of marine mammals, seabirds, and sea turtles. Marine Ecology Progress Series 316:239-246.

Hammond P.S., Bearzi G., Bjørge A., Forney K., Karczmarski L., Kasuya T., Perrin W.F., Scott M.D., Wang J.Y., Wells R.S., Wilson B. 2008. *Phocoena phocoena.* In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.2. <www.iucnredlist.org>.

Hammond P.S., Lockyer C. 1988. Distribution of killer whales in the eastern North Atlantic. Rit Fiskideildar 11:24-41.

Hammond P.S., MacLeod K. 2006. Progress report on the SCANS-II project. Paper prepared for ASCOBANS Advisory Committee, Finland, April 2006. 6 p.

Hashmi D.D.K., Adloff B.B. 1991. Surface frequency of cetaceans in the Strait of Gibraltar. European Research on Cetaceans 5:16-17.

Heldt H. 1949. Incursions de baleinoptères sur les côtes tunisiennes. Annales Biologiques (Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Denmark) 6:80.

Hildebrand J. 2005. Impacts of anthropogenic sound. Pp. 101-124 in: J.E. Reynolds, W.F. Perrin, R.R. Reeves, S. Montgomery, T.J. Ragen (Eds.), Marine mammal research: conservation beyond crisis. The Johns Hopkins University Press, Baltimore. 223 p.

Hirtz M. 1931. Rijetke vrste delfina u vodama Kor?ule. Priroda 27:25-28.

Hirtz M. 1940. Kljunata uljarka (*Hyperoodon ampullatus* Forst.) u vodama Jadrana. Priroda 23:21-24.

Holcer D., Notarbartolo di Sciara G., Fortuna C.M., Onofri V., Lazar B., Tvrtkovic N. 2003. The occurrence of Cuvier's beaked whale *(Ziphius cavirostris)* in Croatian Adriatic waters: historical and recent findings. Pp. 255-256 in: V. Besendorfer, N. Kopjar (eds.), Proceedings of the 8th Croatian Biological Congress, Zagreb.

Holcer D., Notarbartolo di Sciara G., Fortuna C.M., Lazar B., Onofri V. 2006. Occurrence of Cuvier's beaked whales in the southern Adriatic Sea: evidence of an important Mediterranean habitat. Journal of the Marine Biological Association of the United Kingdom 87:359-372. doi: 10.1017/ S0025315407055075

Holden C. 2007. Whale sensing. Science (Washington D.C.) 315:1199.

Horwood J. 1987. The sei whale: population biology, ecology & management. Croom Helm 375 p.

Hoyt E., Notarbartolo di Sciara G. 2008. Species information for managing marine protected areas: improving access and integration. Presented at the World Conservation Congress, Barcelona, October 2008. 14 p.

Hoyt E., Notarbartolo di Sciara G. 2010. Progress report on the establishment of MPAs in the Mediterranean and Black Seas. Sixth Meeting of the Scientific Committee, Casablanca. 11-13 January. SC6/Doc17 11 p.

Hoyt E., Rais C., Notarbartolo di Sciara G. 2006. The ACCOBAMS Programme of Work on Marine Protected Areas (MPAs). Fourth Meeting of the Scientific Committee, Monaco, 5-8 November. SC4/Doc21 69p.

International Maritime Organization. 2009. Measures for minimizing the risks of collisions with cetaceans. Submitted by Italy, Spain, France and Monaco. Marine Environment Protection Committee. MEPC 58/18, 8 May 2009. 5 p.

International Whaling Commission. 2004. Report of the Sub-Committee on Small Cetaceans. J. Cetacean Res. Manage. 6(Suppl.): 315-334.

Italian Cetacean Stranding Database. 2010. Online database at http://mammiferimarini.unipv.it/

Jahoda M., Lafortuna C.L., Biassoni N., Almirante C., Azzellino A., Panigada S., Zanardelli M., Notarbartolo di Sciara G. 2003. Mediterranean fin whale's *(Balaenoptera physalus)* response to small vessels and biopsy sampling assessed through passive tracking and timing of respiration. Marine Mammal Science 19(1):96-110.

Jefferson T.A., Karczmarski L., Laidre K., O'Corry-Crowe G., Reeves R.R., Rojas-Bracho L., Secchi E.R., Slooten E., Smith B.D., Wang J.Y., Zhou K. 2008. *Delphinapterus leucas.* In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.2. <www.iucnredlist.org>

Jepson P.D., Arbelo M., Deaville R., Patterson I.A.P., Castro P., Baker J.R., Degollada E., Ross H.M., Herráez P., Pocknell A.M., Rodríguez F., Howie II F.E., Espinosa A., Reid R.J., Jaber J.R., Martin V., Cunningham A.A., Fernández A. 2003. Gas-bubble lesions in stranded cetaceans. Nature 425: 575-576.

Joiris C.R., Holsbeek L., Bolba D., Gascard C., Stanev T., Komakhidze A., Baumgärtner W., Birkun A. 2001. Total and organic mercury in the Black Sea harbour porpoise *Phocoena phocoena relicta.* Marine Pollution Bulletin 42(10): 905-911.

Kannan K., Corsolini S., Falandysz J., Oehme G., Focardi S., Giesy J.P. 2002. Perfluorooctanesulfonate and related fluorinated hydrocarbons in marine mammals, fishes, and birds from coasts of the Baltic and the Mediterranean Seas. Environmental Science and Technology 36(15):3210-3216.

Kasparek M. 1997. The false killer whale, *Pseudorca crassidens* (Cetacea: Delphinidae), new for Syria. Zoology in the Middle East 14:23-26.

Katona S., Whitehead H. 1988. Are cetacea ecologically important? Oceanography and Marine Biology Annual Review 26:553-568.

Kesapli Didrickson Ö. 2009. Captive dolphins on the increase in Turkey. FINS, the Newsletter of ACCOBAMS 4(2):4-6.

Kerem D. 2005. Rough-toothed dolphins "invading" the port of Haifa. FINS, the Newsletter of ACCOBAMS 2(1):19.

Khalaf G., Fakhri M., David L., Ohanian C. 2010. Activités relatives aux cétacés dans les eaux de la région centrale du Liban. Rapport préliminaire. Projet CANA Lebanon, MoU ACCOBAMS/CNRSL. 9 p.

Kleinenberg S.E. 1956. Mammals of the Black and Azov Seas: Research Experience for Biology and Hunting. USSR Acad. Science Publ. House, Moscow, 288 p. (In Russian).

Komakhidze G., Goradze I. 2005. Estimate of distribution and number of cetaceans in coastal waters of south-eastern part of the Black Sea: Winter – spring – summer 2005. Presentation at the Workshop on Cetaceans Surveying in the Black Sea (Istanbul, Turkey, 17-18 October 2005). (Unpublished).

Korshenko A. 2008. The state of total petroleum hydrocarbons. Pp. 113-129 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Korshenko A., Denga Y., Gvakharia B., Machitadze N., Oros A. 2008. The state of trace metals. Pp. 150-1162 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Korshenko A., Melnikov S. 2008. The state of chlorinated pesticides. Pp. 129-149 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Krivokhizhin S.V. 2009. State of cetacean populations in the waters of Ukraine. PhD thesis, Institute of Biology of Southern Seas, Sevastopol, Ukraine. 228 p. (In Russian).

Krivokhizhin S.V., Balatskiy K.L., Bushuev S.G., Stolyarova Y.A., Selyunina Z.V., Tarina N.A., Masberg I.V., Zhbanov A.V., Zhbanova D.A., Popov S.A., Gridin V.Y., Sergeyenko A.L., Morozova A.L., Zanin A.V., Kononov N.V., Shlyakhov V.A., Litvinyuk N.A., Tkhor N.F., Pshenichnaya L.E., Molodan G.N., Birkun A.A., Jr. 2008. Strandings of cetaceans on the coast of Ukraine (2002–2006). Pp. 300–303 in: Marine Mammals of the Holarctic: Collection of Scientific Papers after the 5th Internat. Conf. (Odessa, Ukraine, 14–18 October 2008). Odessa, 632 p.

Krivokhizhin S.V., Birkun A.A., Jr. 2009. Nourishment spectrum of cetaceans in the Black Sea. Morskoy Ekologichesky Zhurnal 8(4): 67-78. (In Russian).

Krivokhizhin S. Birkun A., Jr., Shpak O., Mukhametov L. 2006. "Offshore" harbour porpoises in the central Black Sea. P. 210 in: Abstr. 20th Annual Conf. of the European Cetacean Society (Gdynia, Poland, 2-7 April 2006). 244 p.

Ktari-Chakroun F. 1980. Les cétacés des côtes tunisiennes. Bulletin de l'Institut d'Océanographie et Pêche Salammbo 7:139-149.

Lacey C., Lewis T., Moscrop, A. 2005. Sightings made during surveys of Mediterranean Sea in 2003 and 2004 including an unusual encounter with rough-toothed dolphins (Steno bredanensis) in the Ionian Sea. In: 19th Ann. Conf. of ECS, La Rochelle, April 2005. 113 p., Abs. # SA- 13.

Laist D.W., Coe J.M., O'Hara K.J. 1999. Marine debris pollution. Pp. 342-366 in: J.R. Twiss Jr., R.R. Reeves (editors), Conservation and management of marine mammals. Smithsonian Institution Press, Washington and London. 471 p.

Lanfranco G.G. 1969. Maltese mammals (Central Mediterranean). Malta (privately published). 28 p.

Laran S., Gannier A. 2008. Spatial and temporal prediction of fin whale distribution in the northwestern Mediterranean Sea. ICES, Journal of Marine Sciences 65(7):1260-1269.

Lauriano G., Caramanna L., Scarnò M., Andaloro F. 2009. An overview of dolphin depredation in Italian artisanal fisheries. Journal of the Marine Biological Association of the United Kingdom 1-9. doi:10.1017/S0025315409000393

Lauriano G., Fortuna C.M., Moltedo G., Notarbartolo di Sciara G. 2004. Interactions between common bottlenose dolphins *(Tursiops truncatus)* and the artisanal fishery in Asinara Island National Park (Sardinia): assessment of catch damage and economic loss. Journal of Cetacean Research and Management 6(2):165-173.

Learmonth J.A., MacLeod C.D., Santos M.B., Pierce G.J., Crick H.Q.P., Robinson R.A. 2006. Potential effects of climate change on marine mammals. Oceanography and Marine Biology: An Annual Review 44:431-464.

Lepri G. 1914. Su di una balenottera arenatasi presso Ostia. Bollettino della Società Zoologica Italiana 3(3):32-38.

Lewis T., Gillespie D., Lacey C., Matthews J., Danbolt M., Leaper R., McLanaghan R., Moscrop A. 2006. Sperm whale abundance estimates from acoustic surveys of the Ionian Sea and Straits of Sicily in 2003. Journal of the Marine Biological Association of the United Kingdom 86(5489):1-5.

Littaye A., Gannier A., Laran S., Wilson J.P.F. 2004. The relationship between summer aggregation of fin whales and satellite-derived environmental conditions in the northwestern Mediterranean Sea. Remote Sensing of Environment 90(1):44-52.

Lotze H.K., Worm B. 2009. Historical baselines for large marine animals. Trends in Ecology and Evolution 24(5):254-262.

Macé M., Bompar J.-M., Fabre J.-L., Bourcaud-Baralon C., Petit C. 1999. The minke whale, *Balaenoptera acutorostrata,* a new candidate for Mediterranean endemic species? European Research on Cetaceans 13:369.

MacLeod C.D. 2005. Niche partitioning, distribution and competition in North Atlantic beaked whales. PhD Thesis. University of Aberdeen, UK.

MacLeod C.D. 2009. Global climate change, range changes and potential implications for the conservation of marine cetaceans: a review and synthesis. Endangered Species Research 7:125-136. doi: 10.3354/esr00197

Marchessaux D. 1980. A review of the current knowledge of the cetaceans in the Eastern Mediterranean Sea. Vie Marine 2:59-65.

Marchessaux D. Duguy R. 1978. Note préliminaire sur les cétacés de la Méditerranée orientale. XXVI Congr®®s-Assemblée plénière. Comité des Vertébrés marins et Céphalopodes. 24 Nov – 2 Dec, Antalya.

Marine Mammal Commission. 2010. http://mmc.gov/oil_spill/welcome.html

Marini L., Consiglio C., Angradi A.M., Sanna, A. 1992. Four sightings of Ziphiidae (Cetacea, Odontoceti) in the central Thyrrenian Sea. Hystrix 4(1): 85-89.

Marini L., Focardi S, 1997. Chlorinated hydrocarbon (HCB, DDTs and PCBs) levels in cetaceans stranded along the Italian coasts: an overview. Env. Monit. Assess. 45:129-180.

Mazzariol S. 2010. Spiaggiamento di 7 esemplari di capodoglio *(Physeter macrocephalus)* sul litorale compreso tra Cagnano Varano e Ischitella (FG) tra il 10 ed il 15 dicembre 2009. Università degli Studi di Padova, Dipartimento di sanità pubblica, patologia comparata ed igiene veterinaria, Agripolis, Legnaro, Padova. 66 p.

McBrearty, D.A. M.A.Message G.A.King 1986. Observations on small cetaceans in the north-east Atlantic Ocean and the Mediterranean Sea: 1978-1982. Pp. 225-249 in: M.M. Bryden and R. Harrison (eds.). Research on dolphins. Clarendon Press, Oxford. 478 p.

Mee L.D., Friedrich J., Gomoiu M.T. 2005. Black Sea oceanography: restoring the Black Sea in times of uncertainty. Oceanography 18(2): 100-111.

Mee L.D., Jefferson R.L., Laffoley D. d'A. , Elliott M. 2007. How good is good? Human values and Europe's proposed Marine Strategy Directive. Marine Pollution Bulletin doi:10.1016/j.marpolbul.2007.09.038

Mezzana N. 1900. Sulla cattura di un *Hyperoodon bidens* Flem. nel Mare Ligustico. Bollettino del Naturalista 20(11):121-122.

Micheli F., Halpern B.S. 2005. Low functional redundancy in coastal marine assemblages. Ecology Letters 8:391-400.

Mikhailov K. 2008. Overview on the current status of cetacean-fisheries conflicts including bycatch and depredation with a critical review of historical data: Bulgaria. International Workshop on Cetacean Bycatch within the ACCOBAMS Area (Rome, Italy, 17-18 September 2008). Working paper, 10 p. (Unpublished).

Mikhalev Y.A. 2004a. The Black Sea bottlenose dolphin (*Tursiops truncatus* Montagu, 1821) distribution pattern according to aerial survey data. Pp. 397-402 in: Marine Mammals of the Holarctic: Collection of Scientific Papers after the 3rd Internat. Conf. (Koktebel, Ukraine, 11-17 October 2004). Moscow, 609 p.

Mikhalev Y.A. 2004b. Distribution peculiarities of harbour porpoises (*Phocoena phocoena relicta* Abel, 1905) in the Black Sea. Pp. 403-407 in: Marine Mammals of the Holarctic: Collection of Scientific Papers after the 3rd Internat. Conf. (Koktebel, Ukraine, 11-17 October 2004). Moscow, 609 p.

Mikhalev Y.A., Savusin V.P., Bushuyev S.G. 2004. Associated connection between the accumulations of fishes and dolphins in the Black Sea according to the data of aerial surveys. Pp. 393-397 in: Marine Mammals of the Holarctic: Collection of Scientific Papers after the 3rd Internat. Conf. (Koktebel, Ukraine, 11-17 October 2004). Moscow, 609 p.

Ministero dello Sviluppo Economico. 2009. http://unmig.sviluppoeconomico.gov.it/unmig/sismica/sismica.asp

Miragliuolo A., Mussi B., Bearzi G. 2001. Risso's dolphin harassment by pleasure boaters off the Island of Ischia, Central Mediterranean Sea. European Research on Cetaceans 15:168-169.

Monticelli F.S. 1926. Sulla *Balaenoptera acuto-rostrata* Lacépède, (1804) presa a Lacco Ameno (Ischia). Bollettino della Società dei Naturalisti, Napoli 37:8-9.

Moulins A., Rosso M., Nani B., Wu¨rtz M. 2007. Aspects of the distribution of Cuvier's beaked whale *(Ziphius cavirostris)* in relation to topographic features in the Pelagos Sanctuary (north-western Mediterranean Sea). Journal of the Marine Biological Association of the United Kingdom 87:177-186. doi: 10.1017/ S0025315407055002

Moulins A., Wu¨rtz M. 2005. Occurrence of a herd of female sperm whales and their calves *(Physeter catodon),* off Monaco, in the Ligurian Sea. J. Mar. Biol. Ass. U.K. 85(1): 213-214.

Mussi B., Miragliuolo A. 2005. Short-beaked common dolphin in the waters of Ischia island: a relic population unit of primary importance in the Italian seas. In: K. Stockin, A. Vella, P.G.H. Evans. Common dolphins: current research, threats and issues. ECS Newsletter N.45. Special Issue July 2005:30-36.

Müller G., Wünschmann A., Baumgärtner W., Birkun A., Komakhidze A., Stanev T., Joiris C.R. 2002. Immunohistological and serological investigations of morbillivirus infection in Black Sea harbour porpoises *(Phocoena phocoena).* Vet. Microbiol. 87(2): 183-190.

Natoli A. 2004. Molecular ecology of bottlenose (*Tursiops* sp.) and common (*Delphinus* sp.) dolphins. PhD thesis, University of Durham, UK.

Natoli A., Birkun A., Aguilar A., Lopez A., Hoelzel A.R. 2005. Habitat structure and the dispersal of male and female bottlenose dolphins *(Tursiops truncatus).* Proceedings of the Royal Society of London Series B Biological Sciences 272(1569):1217-1226.

Natoli A., Cañadas A., Vaquero C., Politi E., Fernandez-Navarro P., Hoelzel A.R. 2008. Conservation genetics of the short-beaked common dolphin *(Delphinus delphis)* in the Mediterranean Sea and in the eastern North Atlantic Ocean. Conservation Genetics 9:1479–1487. DOI 10.1007/s10592-007-9481-1

Neuville H. 1927. Observations sur le genre Steno Gray 1844 (*Glyphidelphis* P. Gerv. 1859). Comptes rendus du Congrès de Constantine de l'Association Française pour l'Avancement des Sciences 51:277-281.

Northridge S. P. 1984. World review of interactions between marine mammals and fisheries. Fisheries Technical Paper 251. Food and Agriculture Organization of the United Nations, Rome. 191 p.

Northridge S., Fortuna C. 2008. Protocol for data collection on bycatch and depredation in the ACCOBAMS region. A standardised methodology for use in the collection of data on cetacean bycatch and depredation of nets (with application for other species of conservation concern). International Workshop on Bycatch within the ACCOBAMS area, Rome (FAO HQs), Italy, 17-18 September 2008. 38 p.

Northridge S., Fortuna C., Read A. 2010. Guidelines for technical measures to minimise cetacean-fishery conflicts in the Mediterranean and Black Seas. Document BU_EXT1-Doc 14, ACCOBAMS, 28 April 2010. 15 p.

Noss R.E. 2007. Values are a good thing in conservation biology. Conservation Biology 21(1):18-20.

Notarbartolo di Sciara G. 1981. L'orca. Società Editrice Internazionale, Torino. 176 p.

Notarbartolo di Sciara G. 1987. Killer whale, *Orcinus orca,* in the Mediterranean Sea. Marine Mammal Science 3(4):356-360.

Notarbartolo di Sciara G. 1990. A note on the cetaceans incidental catch in the Italian driftnet swordfish fishery, 1986-1988. Reports of the International Whaling Commission 40:459-460.

Notarbartolo di Sciara G. (Editor). 2002a. Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A Report to the ACCOBAMS Interim Secretariat. 257 p.

Notarbartolo di Sciara G. 2002b. Cetacean species occurring in the Mediterranean and Black Seas. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 3, 17 p.

Notarbartolo di Sciara G. 2007a. Guidelines for the establishment and management of marine protected areas for cetaceans. Regional Activity Centre, Specially Protected Areas, Tunis. N° 03/2007:1-29.

Notarbartolo di Sciara G. 2007b. The future of ACCOBAMS: heading for the crossroads between progress and failure. FINS, the Newsletter of ACCOBAMS 3(2):24-25.

Notarbartolo di Sciara G. 2008. Why are you smiling, common dolphin? FINS, the Newsletter of ACCOBAMS 4(1):1-3.

Notarbartolo di Sciara G. 2009. The Pelagos Sanctuary for the conservation of Mediterranean marine mammals: an iconic High Seas MPA in dire straits. 2nd International Conference on Progress in Marine Conservation in Europe 2009, 2-6 November 2009, OZEANEUM / DMM, Stralsund, Germany. 4 p.

Notarbartolo di Sciara G., Agardy T. 2009. Identification of potential SPAMIs in Mediterranean Areas Beyond National Jurisdiction. Contract N° 01/2008_RAC/SPA, High Seas. 70 p.

Notarbartolo di Sciara G., Agardy T. (coordinators). 2010. Mapping habitat of Mediterranean predators. 39th CIESM Congress, Venice, 10-14 May 2010.

Notarbartolo di Sciara G., Agardy T., Hyrenbach D., Scovazzi T., Van Klaveren P. 2008. The Pelagos Sanctuary for Mediterranean marine mammals. Aquatic Conservation: Marine and Freshwater Ecosystems 18:367-391. DOI: 10.1002/aqc.855

Notarbartolo di Sciara G., Aguilar A., Bearzi G., Birkun A., Jr., Frantzis A. 2002. Overview of known or presumed impacts on the different species of cetaceans in the Mediterranean and Black Seas. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 17, 4 p.

Notarbartolo di Sciara G., Bearzi G. 2002. Cetacean direct killing and live capture in the Mediterranean Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 5, 4 p.

Notarbartolo di Sciara G., Bearzi G. 2010. National Strategy and Action Plan for the conservation of cetaceans in Greece, 2010-2015. Initiative for the Conservation of Cetaceans in Greece, Athens. 55 p.

Notarbartolo di Sciara G., Demma M. 1997. Guida dei mammiferi marini del Mediterraneo (nuova edizione aggiornata). Franco Muzzio Editore, Padova 264 p.

Notarbartolo di Sciara G., Frantzis A., Bearzi G., Reeves R.R. 2010. Sperm whale, *Physeter macrocephalus* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 8 p.

Notarbartolo di Sciara G., Gordon J. 1997. Bioacoustics: a tool for the conservation of cetaceans in the Mediterranean Sea. Marine and Freshwater Behaviour and Physiology 30:125-146.

Notarbartolo di Sciara G., Panigada S., Zanardelli M. 2006. Studio di settore e del connesso monitoraggio *ante operam* relativo ai flussi migratori dei cetacei attraverso lo Stretto di Messina. rapporto finale. A report to Stretto di Messina SpA, Roma. Istituto Tethys. 168 p.

Notarbartolo di Sciara G., Venturino M.C., Zanardelli M., Bearzi G., Borsani F.J., Cavalloni B. 1993. Cetaceans in the central Mediterranean Sea: distribution and sighting frequencies. Bollettino di Zoologia (Italian Journal of Zoology) 60:131-138.

Notarbartolo di Sciara G., Zanardelli M., Jahoda M., Panigada S., Airoldi S. 2003. The fin whale *Balaenoptera physalus* (L. 1758) in the Mediterranean Sea. Mammal Review 33(2):105-150.

Nowacek D.P., Thorne L.H., Johnston D.W., Tyack P.L. 2007. Responses of cetaceans to anthropogenic noise. Mammal Review 37(2):81-115. 10.1111/j.1365 2907.2007. 00104.x

Oedekoven C.S. Cañadas A., Hammond P.S. 2009. Estimating beaked whale abundances in the northern Alborán Sea using spatial models. 18th Biennial Conference on the Biology of Marine Mammals. Quebec City, 12-16 October 2009.

OCEANA. 2007. Italian driftnets: illegal fishing continues. Oceana 48 p.

Oguz T. 2009. Impacts of climate variability on the Black Sea ecosystem. Pp. 5-6 in: Abstr. 23rd Annual Conf. of the European Cetacean Society (Istanbul, Turkey, 2-4 March 2009). 194 p.

Oguz T., Velikova V., Cociasu A., Korshenko A. 2008. The state of eutrophication. Pp. 83-112 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Orr D.W. 1994. Earth in mind: on education, environment, and the human prospect. Island Press 221 p.

Orsi Relini L., Cagnolaro L. 1996. Does the long-finned pilot whale feed on tuna? A mistake in the Mediterranean literature. European Research on Cetaceans 9:183-184.

Öztürk A.A., Dede A., Tonay M.A., Öztürk B. 2009. Cetacean surveys in the Istanbul (Bosphorus) Strait in 2007-2008. Pp. 29-30 in: Abstr. 23rd Annual Conf. of the European Cetacean Society (Istanbul, Turkey, 2-4 March 2009). 194 p.

Öztürk B. 1999. Cetaceans and the impact of fisheries in the Black Sea. Bull. ACCOBAMS 2:11-12.

Öztürk B., Dede A., Komut O. 1999. Cetacean strandings in the Marmara Sea. P.258 in: P.G.H. Evans, J. Cruz and J.A. Raga (Eds.). Proc. 13th Annual Conf. European Cetacean Society, Valencia, Spain, 5-8 April 1999).

Öztürk B., Öztürk A.A. 1997. Preliminary study on dolphin occurrence in the Turkish Straits System. European Research on Cetaceans 11:79-82.

Öztürk B., Öztürk A.A. 1998. Cetacean strandings in the Aegean and Mediterranean coast of Turkey. Rapports de la Commission Intérnationale pour la Mer Méditerannée 35(2):476.

Öztürk B., Tonay A.M. 2008. Turbot fisheries and its impact on dolphin by-catch in the Black Sea. International Workshop on Cetacean Bycatch within the ACCOBAMS Area (Rome, Italy, 17-18 September 2008). PowerPoint presentation. (Unpublished).

Pace D.S., Miragliuolo A., Mussi B. 2006. Vessels and dolphins: scars that tell stories. FINS, the Newsletter of ACCOBAMS 3(1):19-20.

Pace D.S., Miragliuolo A., Mussi B. 2008. Behaviour of a social unit of sperm whales *(Physeter macrocephalus)* entangled in a driftnet off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Journal of Cetacean Research and Management 10(2):131-135.

Panigada S., Azzellino A. 2009. Determinazione degli habitat critici delle specie di cetacei presenti nell'area del Santuario Pelagos (porzione occidentale), ai fini della gestione. Rapporto finale al Ministero dell'ambiente, del terrigtorio e del mare. Istituto Tethys. 202 p.

Panigada S., Burt L., Lauriano G., Pierantonio N., Donovan G. 2009. Winter abundance of striped dolphins *(Stenella coeruleoalba)* in the Pelagos Sanctuary (north-western Mediterranean Sea) assessed through aerial survey. Journal of Cetacean Research and Management SC/61/SM7. 10 p.

Panigada S., Lauriano G., Burt L., Pierantonio N., Donovan G. 2010. Monitoring winter and summer abundance of cetaceans in the Pelagos Sanctuary through aerial surveys for conservation. P. 70 in: Abstracts of the 24th Conf. of the European Cetacean Society, Stralsund, Germany, 22-24 March 2010. 314 p.

Panigada S., Leaper R. In press. Ship strikes in the Mediterranean Sea: assessment and identification of conservation and mitigation measures. Journal of Cetacean Research & Management.

Panigada S., Notarbartolo di Sciara G. 2010. Fin whale, *Balaenoptera physalus* - Mediterranean subpopulation. Assessment submitted to the IUCN Red List. 6 p.

Panigada S., Pesante G., Zanardelli M., Capoulade F., Gannier A., Weinrich M.T. 2006. Mediterranean fin whales at risk from fatal ship strikes. Marine Pollution Bulletin 52:1287–1298.

Panigada S., Zanardelli M., MacKenzie M., Donovan C., Mélin F., Hammond P.S. 2008. Modelling habitat preferences for fin whales and striped dolphins in the Pelagos Sanctuary (Western Mediterranean Sea) with physiographic and remote sensing variables. Remote Sensing of Environment 112:3400-3412. doi: 10.1016/j.rse.2007. 11.017

Parona C. 1908. Catture recenti di grandi cetacei nei mari italiani. Atti della Società Ligustica di Scienze Naturali e Geografiche 19:173-205.

Paulus M. 1963. Etude ostéographique et ostéometrique sur un pseudorque *(Pseudorca crassidens* Owen 1846) capturé au large de Port-de-Bouc (Bouches-du-Rhône) en Novembre 1948. Bulletin du Museum d'Histoire Naturelle de Marseille 23:29-67.

Perrin W.F., Geraci J.R. 2008. Stranding. pp. 1118-1123 in W.F. Perrin, B. Wu¨rsig, J.G.M. Thewissen (eds.), Encyclopedia of Marine Mammals, 2nd Edition. Academic Press. 1316 p.

Perrin W.F., Mead J.G., Brownell R.L., Jr. 2010. Review of the evidence used in the description of currently recognized cetacean subspecies. Technical Memorandum NOAA-TM-NMFSSWFSC-450, 35 p.

Pesante G., Collet A., Dhermain F., Frantzis A., Panigada S., Podestà M., Zanardelli M. 2002. Review of collisions in the Mediterranean Sea. pp. 5-12 in: G. Pesante, S. Panigada and M. Zanardelli (Eds.), Proceedings of the Workshop "Collisions between cetaceans and vessels: can we find solutions?", 15th Annual Meeting of the European cetacean Society, Roma, 6 May 2001. ECS Newsletter n. 40, Special Issue. March 2002.

Pettersson A., van Bavel B., Engwall M., Jimenez B. 2004. Polybrominated diphenylethers and methoxylated tetrabromodiphenylethers in cetaceans from the Mediterranean Sea. Archives of Environmental Contamination and Toxicology 47(4):542-550.

Pierantonio N., Pavan G., Airoldi S., Panigada S. 2008. Presence of socializing sperm whales in the Ligurian Sea assessed through acoustic, behavioral and photoidentification data. Abstracts, 22nd Annual Conference of the European Cetacean Society, Egmond aan Zee, The Netherlands, 10-12 March 2008.

Pilleri G. 1967. Behaviour of the *Pseudorca crassidens* (Owen) off the Spanish Mediterranean coast. Revue Suisse de Zoologie 74(30):679-683.

Piroddi C., Bearzi G., Christensen V. 2010. Effects of local fisheries and ocean productivity on the northeastern Ionian Sea ecosystem. Ecological Modelling 19 p. doi:10.1016/ j.ecolmodel.2010.03.002

Pliny the Elder (Gaio Plinio Secondo). 1983. Storia naturale. II. Antropologia e zoologia. Libri 7-11. Giulio Einaudi Editore. 705 pp.

Plotoaga G., Stanciu M. 1995. Observations regarding the presence of an individual of *Delphinapterus leucas* in the Romanian Black Sea. Naturalia (Studii si Cercetari) 1: 243-246. (In Romanian).

Podestà M., Cagnolaro L., Cozzi B. 2005. First record of a stranded Gervais' beaked whale, *Mesoplodon europaeus* (Gervais, 1855), in the Mediterranean waters. Atti della Società Italiana di Scienze Naturali del Museo Civico di Storia Naturale di Milano 146(1):109-116.

Podestà M., D'Amico A., Pavan G., Drougas A., Komnenou A., Portunato N. 2006. A review of Cuvier's beaked whale strandings in the Mediterranean Sea. Journal of Cetacean Research and Management 7(3):251-261.

Podestà M., Magnaghi, L. 1989. Unusual number of cetacean bycatches in the Ligurian Sea. European Research on Cetaceans 3:67-70.

Poncelet E., Van Canneyt O., Boubert J.J. 1999. Considerable amount of plastic debris in the stomach of a Cuvier's beaked whale *(Ziphius cavirostris)* washed ashore on the French Atlantic coast. 13th Biennial Conference of the Society for Marine Mammalogy, Hawaii (Maui, Hawaii, USA 28 November-3 December).

Pouchet G., Beauregard H. 1888. Sur la présence de deux baleines franches dans les eaux d'Alger. Comptes-Rendus de l'Académie des Sciences, Paris 106:875-876.

Praca E., Gannier A. 2008. Ecological niches of three teuthophageous odontocetes in the northwestern Mediterranean Sea. Ocean Science 4(1):49-59.

Praca E., Gannier A., Das K., Laran S. 2009. Modelling the habitat suitability of cetaceans: example of the sperm whale in the northwestern Mediterranean Sea. Deep Sea Research Part I 56:648-657. doi:10.1016/ j.dsr.2008. 11.001

Prodanov K., Mikhailov K., Daskalov G., Maxim C., Chashchin A., Arkhipov A., Shlyakhov V., Ozdamar E. 1997. Environmental management of fish resources in the Black Sea and their rational exploitation. General Fisheries Council for the Mediterranean, Studies and Reviews, No. 68, FAO, Rome. 178 p.

Pulcini M., Carlini R., Wurtz M. 1992. Stomach contents of striped dolphins, *Stenella coeruleoalba* (Meyen, 1933 [sic]) from the south-central Tyrrhenian coast. European Research on Cetaceans 6:194-195.

Pullin A.S., Salasfky N. 2010. Save the whales? Save the rainforest? Save the data! Conservation Biology 24(4):915-917. DOI: 10.1111/ j.1523-1739.2010.01537.x

Radu G., Anton E., Dumitrache C. 2008. National overview on the current status of cetacean-fisheries conflicts including bycatch and depredation: Romania. International Workshop on Cetacean Bycatch within the ACCOBAMS Area (Rome, Italy, 17-18 September 2008). Working paper, 14 p. (Unpublished).

Radu G., Popov K., Mikhailov K., Birkun A. 2006. Cetacean mass-stranding in Bulgaria caused by fishing ... however other mortality causes are at work in the wider Black Sea. FINS (Newsletter of ACCOBAMS) 3(1): 32.

Raga J.A., Pantoja J. (Eds.). 2004. Proyecto Mediterráneo. Zonas de especial interés para la conservación de los cetáceos en el Mediterráneo español. Ministerio de Medio Ambiente. Organismo Autónomo Parques Nacionales. Madrid. 219 p.

Raga J.A., Raduan M.A., Blanco C. 1985. Contribuciòn al estudio de la distribuciòn de cetaceos en el Mediterraneo y Atlantico iberico. Miscelania Zoologica, Barcelona 9:361-366.

Raga J.A., Banyard A., Domingo M., Corteyn M., Van Bressem M.-F., Fernández M., Aznar F.-J., Barrett T. 2008. Dolphin morbillivirus epizootic resurgence, Mediterranean Sea. Emerging Infectious Diseases 14(3):471-473.

Reeves R.R. (Editor). 2009. Proceedings of the First International Conference on Marine Mammal protected Areas, March 30 – April 3, 2009, Maui, Hawai'i, USA. NOAA. 133 p.

Reeves R.R., Berggren P., Crespo E.A., Gales N., Northridge S.P., Notarbartolo di Sciara G., Perrin W.F., Read A.J., Rogan E., Smith B.D., Van Waerebeek K. 2005. Global priorities for reduction of cetacean bycatch. WWF. 29 p. <http://www.wwfus.org/ cetaceans/pubs.cfm>

Reeves R.R., Notarbartolo di Sciara G. (compilers and editors). 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain. 137 p.

Reeves R.R. Smith B.D., Crespo E., Notarbartolo di Sciara G. 2003. Dolphins, whales, and porpoises: 2000-2010 conservation action plan for the world's cetaceans. IUCN, Gland, Switzerland, 139 p.

Reilly S.B., Bannister J.L., Best P.B., Brown M., Brownell Jr. R.L., Butterworth D.S., Clapham P.J., Cooke J., Donovan G.P., Urbán J., Zerbini A.N. 2008. *Eschrichtius robustus.* In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.2. <www.iucnredlist.org>.

Relini L. O., Garibaldi F. 1992. Feeding of the pilot whale, *Globicephala melas,* in the Ligurian sea. A preliminary note. European Research on Cetaceans-6. Proceedings of the VI Annual Conference of the European Cetacean Society. (P. G. H. Evans, ed.). European Cetacean Society. 20-22 February, San Remo, Italy:142-145.

REMPEC. 2002. Protecting the Mediterranean against maritime accidents and illegal discharges from ships. Malta. 136 p.

Rendell L., Cañadas A. 2005. Report on Balearics Sperm Whale Project, 2003-2004. Alnitak and SMRU. 8 p.

Rendell L. E., Gordon J. C. D. 1999. Vocal response of long-finned pilot whales *(Globicephala melas)* to military sonar in the Ligurian Sea. Marine Mammal Science 15(2):198-204.

REPCET. 2010. Limiting the risk of collision between commercial vessels and large cetaceans. Presentation of the system. Souffleurs d'Ecume, La Celle, France. 8 p. http://www.repcet.com/ accueil_en

Rey J.C., Cendrero O. 1982. Les mammifères marins trouvés sur les côtes espagnoles en 1981. Conseil Intérnational pour l'Exploration de la Mer. ICES Council Meeting 1982/N. 6. 4 p.

Reyers B., Roux D.J., Cowling R.M., Ginsburg A.E., Nel J.L., O'Farrell P. 2010. Conservation planning as a transdisciplinary process. Conservation Biology 24(4):957-965. DOI: 10.1111/ j.1523-1739.2010.01497.x

Reynolds J.E., Marsh H., Ragen T.J. 2009. Marine mammal conservation. Endangered Species Research 7:23-28. doi: 10.3354/esr00179

Rice D. 1998. Marine mammals of the world: systematics and distribution. Special Publication Number 4, The Society for Marine Mammalogy.

Richerson K., Levin P.S., Mangel M. 2010. Accounting for indirect effects and non-commensurate values in ecosystem based fishery management (EBFM). Marine Policy 34(1):114-119. doi:10.1016/j.marpol.2009.05.001

Richard J., Neuville H. 1936. Sur quelques cétacés observes pendant les campagnes du yacht Princesse Alice. pp. 9-17 in: J. Richard, Résultats des campagnes scientifiques accomplies sur son yacht par Albert 1er, Prince Souverain de Monaco, publiés sous Sa direction. Fascicule XCIV. Documents sur les cétacés et pinnipèdes provenant des campganes du Prince Albert 1er de Monaco. Imprimerie de Monaco. 72 p.

Riggio G. 1882. Sul *Globicephalus melas* Traill. Il Naturalista Siciliano 2(1):7-10.

Roberge J.-M., Angelstam P. 2004. Usefulness of the umbrella species concept as a conservation tool. Conservation Biology 18(1):76-85.

Robineau D. 1975. A propos de la présence du *Steno bredanensis* (Lesson,1828) (Cetacea, Delphinidae) en Méditerranée occidentale. Mammalia 39(1):152-153.

Robineau D. 2005. Cétacés de France. Féderation Française des Sociétés de Sciences Naturelles, Paris. 646 p.

Rocklin D., Santoni M-C., Culioli J-M., Tomasini J-A., Pelletier D., Mouillot D. 2009. Changes in the catch composition of artisanal fisheries attributable to dolphin depredation in a Mediterranean marine reserve. Ices (International Council for the Exploration of the Seas) Journal of Marine Science 66:699-707.

Rosel P.E., Dizon A.E., Haygood M.G. 1995. Variability of the mitochondrial control region in populations of the harbour porpoise, *Phocoena phocoena,* on interoceanic and regional scales. Can. J. Fish. Aquat. Sci. 52(6): 1210-1219.

Rosel P.E., Frantzis A., Lockyer C., Komnenou A. 2003. Source of Aegean Sea harbour porpoises. Mar. Ecol. Prog. Ser. 247: 257-261.

Ross P.S. 2006. Fireproof killer whales *(Orcinus orca):* flame-retardant chemicals and the conservation imperative in the charismatic icon of British Columbia, Canada. Canadian Journal of Fisheries and Aquatic Sciences 63(1):224-234.

Rossi D.M. 1996. La terza volta della balena franca. Airone 184(8):18.

Rosso M., Moulins A., Wurtz M. 2009. Population size and residence patterns of Cuvier´s beaked whale *(Ziphius cavirostris)* in the Genova canyon, northwestern Mediterranean Sea. 18th Biennial Conference on the Biology of Marine Mammals. Quebec City, 12-16 October 2009.

Roussel E. 2002. Disturbance to Mediterranean cetaceans caused by noise. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 13, 18 p.

Saad A. 2004. First record of a humpback whale stranding on the coast of Syria (Eastern Mediterranean). FINS, the Newsletter of ACCOBAMS 1(1):10.

Saad A., Othman A. (compilers). 2008. National overviews on the current status of cetacean-fisheries conflicts including bycatch and depredation: Syria. International workshop on bycatch within the ACCOBAMS area. Rome (FAO HQs), Italy, 17-18 September 2008. 4 p.

Sagarminaga R., Cañadas A. 1997. A long-term survey on distribution and dynamics of cetaceans along the south-eastern coast of Spain: fourth year of research,1992-95. European Research on Cetaceans 10:125-129.

Scalise S., Moulins A., Rosso M., Corsi A., Wu¨rtz M. 2005. First results on Cuvier's beaked whale distribution in the Ligurian Sea related to depth and depth gradient. 34th Annual Symposium of the European Association for Aquatic Mammals. Riccione, Italy. March, 17-20.

Scheinin A.P. 2010. The population of bottlenose dolphins *(Tursiops truncatus),* bottom trawl catch trends and the interaction between the two along the Mediterranean continental shelf of Israel. Thesis submitted for the degree "Doctor of Philosophy", University of Haifa, Faculty of Humanities, Department of Maritime Civilisations, Israel. 172 p.

Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS, the newsletter of ACCOBAMS 1(1):19.

Schweitzer J. 2010. The guilt and guile of going green. The Huffington Post, 23 Aug. 2010 www.huffingtonpost.com/jeff-schweitzer/

Scordìa C. 1939. Intorno alle incursioni del *Globicephalus melas* (Traill) nello stretto di Messina, e ai danni che ne vengono apportati alla pesca del tonno. Memorie di Biologia Marina e di Oceanografia 6(2):1-7.

Scovazzi T. 2002. ACCOBAMS and the relevant provisions of domestic and international law. Document MOP1/Inf9, First Meeting of the Parties to ACCOBAMS, Monaco, Feb.-Mar. 2002. 40 p.

Shiganova T., Musaeva E., Arashkevich E., Kamburska L., Stefanova K., Mihneva V., Polishchuk L.,Timofte F., Ustun F., Oguz T., Khalvashi M., Tarkan A.N. 2008. The state of zooplankton. Pp. 201-246 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Shlyakhov V.A., Daskalov G.M. 2008. The state of marine living resources. Pp.321-364 in: State of the Environment of the Black Sea: 2001-2006/7 (Ed. by T. Oguz). BSC Publ., Istanbul, Turkey, 448 p.

Shoham-Frider E., Amiel S., Roditi-Elasar M., Kress N. 2002. Risso's dolphin *(Grampus griseus)* stranding on the coast of Israel (eastern Mediterranean). Autopsy results and trace metal concentrations. Science of the Total Environment 295(1-3):157-166.

Shoham-Frider E., Kress N., Wynne D., Scheinin A., Roditi-Elsar M., Kerem D. 2009. Persistent organochlorine pollutants and heavy metals in tissues of common bottlenose dolphin *(Tursiops truncatus)* from the Levantine Basin of the eastern Mediterranean. Chemosphere 77(5):621-627. DOI10.1016/j. chemosphere. 2009.08.048

Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, *Tursiops truncatus,* interacting with fisheries in the Balearic Islands, Spain. European Research on Cetaceans 6:32–34.

Simmonds M., Nunny L. 2002. Cetacean habitat loss and degradation in the Mediterranean Sea. In: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: state of knowledge and conservation strategies. A report to the ACCOBAMS Secretariat, Monaco, February 2002. Section 7, 23 p.

Smith B. 2003. The discovery and development of dolphin-assisted therapy. In: Frohoff T., Peterson B. (editors). Between Species: Celebrating the Dolphin-Human Bond. Sierra Club Books, San Francisco.

Song of the Whale Research Team - IFAW. 2007. Some results of cetacean surveys between 2003 and 2007 in the Mediterranean's western and eastern basins. IFAW report to the 3rd Meeting of Parties to ACCOBAMS, Dubrovnik, Croatia, Oct. 2007. 19 p.

Sorokin S., Birkun A. 2008. National overview on the current status of cetacean-fisheries conflicts including bycatch and depredation with a critical review of historical data: Ukraine. International Workshop on Cetacean Bycatch within the ACCOBAMS Area (Rome, Italy, 17-18 September 2008). Working paper, 11 p. (Unpublished).

Stanzani A.L., Piermarocchi C. 1992. Cattura di alcuni individui di *Pseudorca crassidens* (Owen, 1846) in Adriatico. Atti della Società Italiana di Scienze naturali e del Museo Civico di Storia Naturale di Milano 133(7):89-95.

Teilmann J., Dietz R., Eskesen I. 2004. A journey of a minke whale - from Denmark to the Mediterranean. European Research on Cetaceans 18.

Tejedor Arceredillo A., Sagarminaga R., de Stephanis R., Cañadas A., Lago A. 2008. Management of MPAs: options and challenges for the maritime trasport sector: Spanish case studies. Pp. 93-98 in: P.G.H. Evans (ed.), Selection criteria for marine protected areas for cetaceans. Proceedings of the ECS/ASCOBANS/ACCOBAMS Workshop, 21st Annual Conference of the European Cetacean Society, San Sebastian, Spain, 22 Apr. 2007. 106 p.

Tomilin A.G. 1967. Mammals of the USSR and adjacent countries. Vol. 9. Cetacea. Israel Program for Scientific Translations, Jerusalem. 717 p.

Tonay A.M., Dede A., Öztürk A.A., Ercan D., Fernández A., Öztürk B. 2010. Unusual mass mortality of cetaceans on the coast of the Turkish western Black Sea in summer 2009. P. 290 in: Abstracts of the 24th Conf. of the European Cetacean Society, Stralsund, Germany, 22-24 March 2010. 314 p.

Tonay A.M., Dede A., Öztürk A.A., Öztürk B. 2009. Cetacean strandings in the Turkish Straits System (TSS) and the Northern Aegean Sea coast of Turkey during 1999-2008. P. 123 in: Abstr. 23rd Annual Conf. of the European Cetacean Society (Istanbul, Turkey, 2-4 March 2009). 194 p.

Tonay A.M., Öz M.I. 1999. Stomach contents of harbour porpoises entangled in the fishing nets in the western Black Sea. Pp. 92-98 in: Proc. Ann. Conf. on Underwater Science and Technology (SBT'99, Turkey, 1999). (In Turkish).

Tonay A.M., Öztürk B. 2003. Cetacean bycatches in turbot fishery on the western coast of the Turkish Black Sea. Pp. 131-138 in: I.K. Oray, M.S. Çelikkale and G. Özdemir (Eds.), Internat. Symp. of Fisheries and Zoology in memory of Ord. Prof. Dr. Curt Kosswig in his 100th birth anniversary (Istanbul, Turkey, 23-26 October 2003).

Tonay A.M., Topçu E.N., Dede A., Öztürk A.A. 2008. Project of cetacean bycatch and stranding related to turbot fishery and marine litter pollution in the western Turkish Black Sea coast: Final report. Joint Programme of the BSC PS and ACCOBAMS PS on Marine Litter and Marine Mammals Conservation in the Black Sea. 89 p. (Unpublished).

Triantafillou C. 2008. The changing face of marine litter. The Monachus Guardian 11(1):1-12.

Tudela S., Kai Kai A., Maynou F., El Andalossi M., Guglielmi P. 2005. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alborán Sea (SW Mediterranean). Biological Conservation 121(1):65-78. 10.1016/j.biocon.2004.04.010

Tzalkin V.I. 1938. Morphological characteristics, systematical status and zoogeographic significance of the harbour porpoise from the Azov and Black Seas. Zoologichesky Zhurnal 17(4): 706-733. (In Russian).

Underhill K. 2006. Boat traffic effects on the diving behaviour of bottlenose dolphins *(Tursiops truncatus* Montagu*)* in Sardinia, Italy. Thesis submitted for the degree of Master of Science. School of Biological Sciences, University of Wales, Bangor. 60 p.

UNEP MAP. 2009. Results of the assessment of the status of marine litter in the Mediterranean. Meeting of MED POL Focal Points, Kalamata (Greece), 2-4 June 2009. Doc. UNEP(DEPI)/MED WG. 334/Inf.5. 91 p.

Valeiras J., Camiñas J.A. 2001. Captura accidental de mamíferos marinos en las pesquerías españolas de palangre de pez espada y túnidos en el Mediterráneo. II Simposium de la Sociedad Española de Cetáceos. SEC. Noviembre, Valsain, Segovia.

Van Bressem M.-F. 2009a. Emergency Task Force: guidelines for a coordinated cetacean stranding response during mortality events caused by infectious agents and harmful algal blooms. Doc. SC6-Doc21 presented at the 6th Meeting of the ACCOBAMS Scientific Committee, Casablanca, 11-13 Jan. 2010. 29 p.

Van Bressem M.-F. 2009b. Emergency Task Force: guidelines concerning best practices and procedures for addressing cetacean mortality events related to chemical, acoustic and biological pollution. Doc. SC6-Doc23 presented at the 6th Meeting of the ACCOBAMS Scientific Committee, Casablanca, 11-13 Jan. 2010. 25 p.

Van Bressem M.-F., Raga J.A., Di Guardo G., Jepson P.D., Duignan P.J., Siebert U., Barrett T., De Oliveira Santos M.C., Moreno I.B., Siciliano S., Aguilar A., Van Waerebeek K. 2009. Emerging infectious diseases in cetaceans worldwide and the possible role of environmental stressors. Diseases of Aquatic Organisms 86(2):143-157. DOI 10.3354/dao02101

Van Waerebeek K., André M., Sequeira M., Martin V., Robineau D., Collet A., Papastavrou V., Ndiaye E. 1999. Spatial and temporal distribution of the minke whale, *Balaenoptera acutorostrata* (Lacépède, 1804), in the southern northeast Atlantic Ocean and the Mediterranean Sea, with reference to stock identity. J. Cetacean Res. Manage. 1(3):223-237.

Vella A. 2002. Status of common dolphins, *Delphinus delphis* in the central Mediterranean region. Abstracts, European Cetacean Society Annual Meeting, Liège, Belgium, 7-9 April 2001.

Vella A. 2005. Common dolphin *Delphinus delphis* research and conservation requirements in the Central Mediterranean around the Maltese Islands. In: K. Stockin, A. Vella, P.G.H. Evans. Common dolphins: current research, threats and issues. ECS Newsletter N.45. Special Issue July 2005:4-12.

Verborgh P., 2005. Population estimation and survival rate of long-finned pilot whales (*Globicephala melas)* in the Strait of Gibraltar. Ms Thesis. University of Bangor, UK.

Verborgh P., de Stephanis R., Pérez S., Sánchez A., Cañadas A., Guinet C. In press. Estimación de la abundancia absoluta de las poblaciones residentes y semi-residentes de cetáceos en el Estrecho de Gibraltar. Almoraima.

Verriopoulou A., Tounta E. and Dendrinos P. 2001. First report of a minke whale *(Balaenoptera acutorostrata* Lacépède, 1804) in Hellenic waters. Aquat. Mamm. 27(2):137-9.

Viaud-Martinez K.A., Brownell R.L., Jr., Komnenou A., Bohonak A.J. 2008. Genetic isolation and morphological divergence of Black Sea bottlenose dolphins. Biol. Conserv. 141: 1600–1611.

Viaud-Martinez K.A., Martínez Vergara M., Gol'din P.E., Ridoux V., Öztürk A.A., Öztürk B., Rosel P.E., Frantzis A., Komnenou A., Bohonak A.J. 2007. Morphological and genetic differentiation of the Black Sea harbour porpoise *Phocoena phocoena.* Mar. Ecol. Prog. Ser. 338: 281–294.

Vinciguerra D. 1926. Due rari cetacei di Liguria (*Ziphius cavirostris,* Cuv. e *Pseudorca crassidens,* Owen). Annuali Museo di Storia Naturale di Genova 52:232-235.

Wassif K. 1956. *Pseudorca crassidens* Owen from Mediterranean shores of Egypt. Journal of Mammalogy 37(3):456.

Watkins W.A., Tyack P., Moore K.E., Notarbartolo di Sciara G. 1987. *Steno bredanensis* in the Mediterranean Sea. Marine Mammal Science 3:78-82.

Weilgart L., Brinkman R., Clark C., Diebold J., Duncan P., Habiger R., Hatch L., Hildebrand J., Nash P., Nedwell J., Ridyard D., Tenghamn R., van der Sman P., Wood W., Young J.V. 2010. Reducing the potential for seismic airgun impacts on cetaceans through alternative technologies for oil and gas exploration. Pp. 84-85 in: Abstracts of the 24th Conf. of the European Cetacean Society, Stralsund, Germany, 22-24 March 2010. 314 p.

Weinrich M.T., Panigada S., Guinet C. 2006. ACCOBAMS Workshop on Large Whale Ship Strikes in the Mediterranean Sea. Monaco, 14-15 November 2005. Report to the Secretariat of ACCOBAMS.

Wells R.S., Rhinehart H.L., Hansen L.J., Sweeney J.C., Townsend F.I., Stone R., Casper D.R., Scott M.D., Hohn A.A., Rowles T.K. 2004. Bottlenose dolphins as marine ecosystem sentinels: developing a health monitoring system. EcoHealth 1:246-254.

Wilkinson D., Worthy G.A.J. 1999. Marine mammal stranding networks. Pp. 396-411 in: J.R. Twiss Jr., R.R. Reeves (editors), Conservation and management of marine mammals. Smithsonian Institution Press, Washington and London. 471 p.

Williamson C., Brakes P. 2007. Dolphin Assisted Therapy: can you put your faith in DAT? Whale and Dolphin Conservation Society 21 p.

Wood L.J., Fish L., Laughren J., Pauly D. 2008. Assessing progress towards global marine protection targets: shortfalls in information and action. Oryx 42(3):1-12. doi:10.1017/S003060530800046X

Worm B., Barbier E.B., Beaumont N., Duffy J.E., Folke C., Halpern B.S., Jackson J.B.C., Lotze H.K., Micheli F., Palumbi S.R., Sala E., Selkoe K.A., Stachowicz J.J., Watson R. 2006. Impacts of biodiversity loss on ocean ecosystem services. Science 314:787-790.

Wright A.J., Aguilar Soto N., Baldwin A.L., Bateson M., Beale C.M., Clark C., Deak T., Edwards E.F., Fernández A., Godinho A., Hatch L., Kakuschke A., Lusseau D., Martineau D., Romero L.M., Weilgart L., Wintle B., Notarbartolo di Sciara G., Martin V. 2007. Do marine mammals experience stress related to anthropogenic noise? International Journal of Comparative Psychology 20(2-3):274-316.

Yassine Z., Noureddine A., Najib E., Beyounes A. 2004. Etude de l'interaction entre le grand dauphin et la peche à la senne coulissante en Mediterranée marocaine. Report by the Institut National de Recherche Halieutique. 52 p.

Zaitsev Y.P. 2006. An Introduction on the Black Sea ecology. Even, Odessa, 224 p. (In Russian).

Zaitsev Y., Mamaev V. 1997. Marine biological diversity in the Black Sea: a study of change and decline. United Nations Publ., New-York, 208 p.

10. Acknowledgments

First, we wish to express our gratitude to the ACCOBAMS Secretariat, and in particular to Marie-Christine Grillo Compulsione, the Executive Secretary, and to Maylis Salivas, Camille Montiglio and Fannie Dubois, for their support in the preparation of this document. Giovanni Bearzi and Simone Panigada provided helpful suggestions. In the species accounts we were fortunate to benefit from recent reviews which had been drafted for the inclusion of the region's cetaceans in the IUCN Red List; while we explicitly referred to such reviews where appropriate, we would like to acknowledge the excellent work of our colleagues Alex Aguilar, Giovanni Bearzi, Ana Cañadas, Caterina Fortuna, Alexandros Frantzis, Stefania Gaspari, Ada Natoli, Simone Panigada, Randall R. Reeves, and Renaud de Stephanis. Finally, we wish to thank the following colleagues who generously agreed to share their excellent, often unique photographic documentation: Sergey Krivokhizhin, Brema Laboratory; Enrico Villa, CetaceanWatching, Madalena do Pico, Azores, Portugal; Gianni Pavan, CIBRA, Pavia; David Alarcón, Marco Barbate, Renaud de Stephanis, CIRCE; Argyris Kallianiotis, Fisheries Research Institute, Kavala; Mia Elasar, Aviad Scheinin, IMMRAC; Tilen Genov, Morigenos; Harun Güçlüsoy and Ozgur Kesapli Didrickson, SAD DEMAG; Souffleurs d'Ecume; Stefano Agazzi, Giovanni Bearzi, Federico Bendinoni, Silvia Bonizzoni, Caterina Lanfredi, Alessia Scuderi, Tethys Research Institute; Preben Toft.

Back cover: A pod of striped dolphins *(Stenella coeruleoalba)* swims at high speed in the Strait of Gibraltar. Photograph by David Alarcón/CIRCE.

Giuseppe Notarbartolo di Sciara is a marine conservation biologist with a doctoral degree from the Scripps Institution of Oceanography, in California. He has been concerned for over 30 years with the advancement of knowledge of the natural history, ecology, behaviour, and taxonomy of marine mammals and cartilaginous fishes, has described a new species of manta ray, and published more than 130 scientific papers. During the past 20 years he has concentrated efforts on conservation, in particular through the development of marine protected areas. In the early '90s he has spearheaded the creation of the first high-seas marine protected area, the Pelagos Sanctuary for Mediterranean Marine Mammals, established in 2002 by a treaty among France, Italy and Monaco. He has been responsible for the leading and management of governmental and private, national and international science and conservation organisations, including the Tethys Research Institute, the Italian Central Institute for Applied Marine Research (ICRAM), and the European Cetacean Society. Dr. Notarbartolo di Sciara is the Regional Coordinator for the Mediterranean and Black Seas of IUCN's World Commission for Protected Areas, is the Deputy Chair of IUCN's Cetacean Specialist Group, coordinates the CIESM Task Force on marine mammals, teaches marine biodiversity conservation at the University of Milan, and has chaired the Scientific Committee of ACCOBAMS since the beginning of the agreement. In 2009 he received the Knighthood in the Order of St. Charles from H.S.H. the Prince Albert II of Monaco (for more details: www.disciara.net).

Alexei A. Birkun, Junior has been educated initially as a human physician and obtained a PhD degree in the field of experimental pathology from the Sechenov 1st Moscow Medical University. In 1982, as a senior researcher of the Georgiyevsky Crimea State Medical University, he started to study health problems of marine mammals including diseases and other disorders of wild and captive cetaceans, pinnipeds and sea otters. Since the late 1980s he almost completely focused his activities on research and conservation of Black Sea dolphins and porpoises and their natural habitats. His interests and applied methodology extend from cetacean microbiology, immunology, ecotoxicology, pathobiology and genetics to population assessment by means of aerial and boat surveys. He coordinated over 30 research and conservation projects in the Black and Azov Sea areas and still shares his knowledge and skills with colleagues in all countries of the region. Dr. Birkun is an author of over 220 scientific publications and reports. He is a co-founder and first director of the Brema Laboratory (a private research institution in Ukraine), and a co-founder and first chairman of the Black Sea Council for Marine Mammals (BSCMM, an international NGO). Since the very beginning, he is a member of the ACCOBAMS Scientific Committee, being also a member of IUCN's Cetacean Specialist Group and CIESM's Expert Panel on Cetaceans, as well as a consultant on marine mammals to the Black Sea Commission (Bucharest Convention).